Government Museum, Chennai

MUSEUMS' JOURNAL

(April 2000 - September 2000)

Published by
Dr. R. KANNAN, Ph.D., I.A.S.,
Commissioner of Museums,
Government Museum, Chennai-600 008.
December 2000

GOVERNMENT MUSEUM, CHENNAI

MUSEUM'S JOURNAL
April - September 2000

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Front Cover
National Art Gallery (Victoria Hall) 1906 AD.

Back Cover
Museum Theatre, 1896 AD.

Authors of the articles are responsible for their views in the articles.

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Letter from the Commissioner...... ✍

I am happy to present this issue of the journal of this Museum for the period from April 2000 to September 2000.

The Government Museum, Chennai was established in the year 1851. Now it is entering the 150th year in the service of the preservation of cultural Heritage of South India. We are planning to celebrate the 150th year celebration with various programmes such as conservation / restoration of old buildings of the museum (Pantheon Buildings and National Art Gallery), a seminar, release of souvenir and a stamp of the Museum Theatre.

In order to provide access the Museum from anywhere in the World a Web site and a Virtual Museum are to be made operational shortly.

Government have sanctioned Rs.40.00 lakhs for the year 2000-2001 for projects such as creation of a Web site and a Virtual Museum for the Museum, providing toilet facilities with all modern amenities for the convenience of the visiting public, modern lighting arrangements such as fibre optic lighting for paintings displayed in the National Art Gallery, purchase of fire fighting equipment, security measures for Rani Mangammal Building of the Tiruchirapalli Museum etc. The works are in progress.

In order to promote traditional folklore art and to train interested persons, workshops have been conducted in collaboration with the National Folklore Support Centre, Chennai in the Government Museum, Chennai. Three workshops on Thanjavur, Kalamkari and Madhubani paintings were conducted so far from April to September 2000

Monthly popular lectures, summer courses, seminars, exhibitions, competitions, training programmes etc., were conducted both in Chennai and in the district museums in order to inculcate a taste for preserving art in the minds of children. The Commissioner of Museums and Curators conducted research on topics, pertaining to

their subjects and the outcomes were published in the form of articles and books. These have received good reviews and attracted a great deal of public attention.

The Chemical Conservation and Research Laboratory of the Government Museum, Chennai has been recommended as one of the Laboratories chosen for imparting training in conservation by the Government of India by the Committee on Upgradation of Museums.

The Chennai Metropolitan Water Supply and Sewage Board has set up rainwater harvesting facilities in our Campus. The District Museum, Tirunelveli has been shifted to a Heritage building.

I have given a bird's eye view of the important activities that had taken place in the period of six months from April 2000 to September 2000.

Suggestions are welcome on how to improve the journal in future issues.

Chennai-600008, (Dr.R.KANNAN, Ph.D., IAS.)
15-12-2000.

MUSEUM NEWS

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Description of the colour photographs in the previous pages

1. The Hon'ble Minister for Tamil Official Language, Tamil Culture, Hindu Religious and Endowments, Dr. M. Tamizhkkudimagan, inaugurated the illumination of National Art Gallery building and special lighting arrangements for the Tyrannosaurus and Stegosurus models kept in the lawn of the Children's Museum building on 14.08.2000. Hon'ble Speaker, Thiru. Parithi Ilam Vazhuthi, Thiru. S. Ramakrishnan, IAS., Secretary and the Commissioner of Museums look on.

2. Dr. R. Kannan, Ph. D., IAS., and Thiru. K. Lakshminarayanan, Curator for Education inspects a Buddha stone sculpture at Pettaivaithalaipettai in Tiruchirappalli district.

3. VIPs and public enjoy the illuminated fountain in front of the National Art Gallery and the dinosaur models in front of the Children's Museum of the Government Museum, Chennai.

4. The Illuminated Tyrannosaurus and Stegosaurus models.

5. The book entitled Restoration of Oil Paintings from Madras Christian College by Dr. V. Jeyaraj, Curator, Chemical Conservation and Research Laboratory of the Museum was released by the Commissioner of Museums and received by former Director of Museums, Thiru. N. Harinarayana. Principal, Madras Christian College; Principal, Government College of Arts and Crafts; Superintending Archaeologist (Archaeological Survey of India); Curator for Education look on.

6. Thiru. K. S. Sripathi, IAS., Chairman and Managing Director, TAMIN, delivers the inaugural address in the fourth course on Importance of Geological Specimens.

7. Thiru. Gagandeep Singh Bedi, IAS., goes round the exhibition of paintings drawn by the participants of the Summer Training Course conducted in the Government Museum, Madurai.

8. Estampaging by the participants in the one-day camp on "Inscription" conducted by the Government Museum, Palani.

9. Commissioner of Museums inspects the Rock Art at Idukatti, Nilgiris. Museum Curator and Guide to the *Nunkalaikkoodam* look on

MUSEUM NEWS

DEPARTMENT OF MUSEUMS – AN INTRODUCTION

Government Museum, Chennai was established in the year 1851 with 1100 geological objects. This Museum has now developed in to a multipurpose museum with various sections like Archaeology, Numismatics, Anthropology, Botany, Zoology, Geology and Children's Museum. It also includes Education, Design and Display and Chemical Conservation and Research Laboratory as supporting branches. In order to impart museum education through out the State of Tamil Nadu, 19 district museums were established in districts of Tamil Nadu. Collection and registration of objects, preservation, research, display and publication are the major objectives of these Museums.

Government Museum, Chennai functions from 9.30 AM to 5.00 PM on all working days. On Fridays and National Holidays this museum is closed.

This Museum Journal includes a number of articles and information about the activities of this Museum from April 2000 to September 2000.

This Department has district museums at the following places:

1. Government Museum, Thirugokarnam, Pudukkottai-622 002 Ph.No. 04322/22247
2. Government Museum, Navalar Salai, Salem-636 001
3. Government Museum, Gandhi Museum Complex, Madurai-625 020. Ph.No. 0452 / 650298
4. Government Museum, Rani Mangammal Hall, Trichirapalli-620 002
5. Government Museum, Fort, Vellore-632 004
6. Government Museum, Municipal Office Complex, Erode-638 001

7. Government Museum, Bali House, 70, Mysore Road, Ooty-643 001
8. Government Museum, Kattur, Coimbatore-642 009
9. Government Museum, Government Hospital Road, Cuddalore-607 001
10. Government Museum, St. Mark's Road, Samathanapuram, Palayamkottai, Tirunelveli-627 002
11. Government Museum, Gandhi Memorial Road, Kanyakumari-622 702
12. Government Museum, Near Apsara Theatre, Krishnagiri-635 001
13. Government Museum, Foot of the Hills, Pazhani-624 601
14. Government Museum; Weekly Market Road, Sivaganga-630 561
15. Government Museum, A/M Thiagarajaperumal Temple, Thiruvarur-2
16. Government Museum, 35, First Line Beach, Nagapattinam-609 001
17. Government Museum, 117, Munusamy Avenue, Kanchipuram- 636501
18. Government Museum, Asanammal Buildings, Head Post Office Road, Ramanathapuram-623 501
19. Government Museum, Municipal Commercial Complex, Karur.-639 001.

SPECIAL FEATURES:

The Hon'ble Minister for Tamil Official Language, Tamil Culture, Hindu Religious and Endowments, Dr. M. Tamizhkkudimagan, inaugurated the illumination of National Art Gallery, colour lights synchronised water fountain in front of the National Art Gallery building and special lighting arrangements for the dinosaur models kept in the lawn of the Children's Museum building on 14.8.2000 in the Government Museum, Chennai.

Workshops were conducted in collaboration with the National Folklore Support Centre, Chennai to promote traditional art and culture, to create awareness among the general public and to train the enthusiastic personalities. In this series workshop on *Thanjavur, Kalamkari* and *Madhubani paintings* were conducted and yet we have

to conduct a series of such programmes in the Centenary Exhibition Hall of Government Museum, Chennai.

The Government Museum, Madurai and Gandhi Memorial Museum, Madurai jointly conducted Summer Training Course from 24.4.2000 and 24.5.2000. Training was given to 1000 students in various arts like *vocal*, *veena*, *violin*, *mirudangam*, *flute*, *bharathanatyam*, *painting*, *'varmakkalai'*, *silambam*, *karate*, *toy making*, *photography* and *glass painting* etc. Thiru Gagandeep Singh Bedi, IAS., Commissioner of Madurai Corporation issued the certificates to the trainees in the valedictory function held on 27.5.2000.

The Government Museum, Tirunelveli was shifted from the rented building to a Government owned Heritage building at St. Mark's Road, Palayamkottai, on 1.4.2000. After completing the display arrangements, this museum was inaugurated by the District Collector, Thiru K.Dhanavel, I.A.S., on 2.8.2000. Shifting of the Government Museum, Coimbatore to a suitable building is in progress.

Thiru Vinod Daniel, Scientist, Australian Museum and the Commissioner of Museums, Chennai along with Curators had a discussion regarding the proposed special exhibition on '*Elephants*'.

IMPORTANT ADDITIONS

As Treasure-trove Finds

In Chennai:

5 Silver Indo-British (4 Victoria and 1 George V) coins from Pudukkottai District and 191 gold "South Indian *Panam*" from Dharmapuri District were received and added to the Numismatic collection of the Museum.

4 pieces of gold wire and a gold waist band from Ponnagaram of Dharmapuri District, 11 pieces of thin gold sheet from Mottur of

Dharmapuri District, 46 silver items of 19 kinds like *waist band, ring, minji, araimudi, alamurugu kadukkan*, etc., from Seralapatti village, were received and added to the anthropological collections of the Museum.

In Districts:

Pudukkottai:

A stone sculpture of *Vinayaka* (56 cm) from Koothanallur was added to the museum collection.

Salem:

A bronze icon of Someswarar (10th century AD, ht. 21 cm) was received from the Tahsildar, Salem as treasure-trove object and added to the collection of the museum.

Madurai:

A tripod metallic stand and an iron axe of Nayak period from Melur Taluk, a small bronze icon of Durga (ht.8 cm) from Tirumangalam Taluk were received as treasure-trove objects in the Museum.

Tiruchirapalli:

A small bronze icon of crawling Krishna (5 cm x 3 cm) was received from Lalkudi Taluk as treasure- trove object and added to the museum collection.

Vellore:

Eight copper swords from Appukkal village were received as treasure-trove objects and added to the museum collection

Erode:

A 12th century A.D. stone inscription (118 x 70 cm) in Canarese language and a Sridevi (94 x 28 cm) stone sculpture of Kongu Chola period from Sathiyamangalam were added to the museum collection.

Tirunelveli:

Four bronze icons of Valli (34 cm), Deivanai (31 cm), (15–16th century A.D.) Bhama (27 cm) and Rukmani (1.4 cm) (17–18th Century A.D) from Majra Chekkadivilai of Kommidikottai Village, a brass *kavasam* (60 cm) of Kali sculpture 19th century from Kummikulam village, one vessel made of brass (17th century AD) from Adichanallur village, two crawling Krishna bronze (10 and 7 cm) icons, a broken chunk, a small water vessel and a small bowl (18th century AD) from Kizhmanjuvilai village were received as treasure-trove objects in the museum

Kanyakumari:

A Srinivasa (18th Century AD) and a Batreswari (17th Century AD) (Stone sculptures) were received in the Museum as treasure-trove finds from the Villavancode Taluk Office.

Krishnagiri:

Two brass blocks (440g rams, 250 grams) were added as treasure-trove objects in the museum.

Cuddalore:

A fragment of stone inscription (3.25 X 1.75 feet) belonging to the British period from the District Collector's bungalow, head mutilated stone sculptures of Vishnu (3 feet) and Sri Devi (3.25 feet) of 10th century AD were added to the collection of the museum.

Palani:

A stone sculpture of Ayyanar from Mattapparai village was received and added to the collection as treasure- trove object.

Sivaganga:

A Vishnu stone sculpture (18th century A.D.) from the Tahsildar, Karaikudi taluk, was received as treasure-trove object and added to the museum collection.

Tiruvarur:

Four metal objects such as *Pooja* plates (5 kg), 2 Nos. of lamps (400 gms) and water pot (400 gms) were received as treasure-trove objects in the museum from Vedaranyam Tahsildar.

Nagapattinam:

A Subramaniya stone sculpture (3.75 feet) of recent period from Sembodai village was received from Vedaranyam Tahsildar as treasure-trove object in the museum.

Karur:

10th Century AD stone sculptures of Ayyanar (52 cm), Thikpalaka (84 cm) and a hero stone (140 cm) were received from Kuzhithalai taluk and added to the museum collection.

THROUGH FIELD COLLECTION AND GIFT:

In Chennai:

15 numbers of geological specimens from Geological Survey of India, 12 multicolour granite specimens like dolorite, leptinite from M/s. Gem Granites were received as gift (Geology); 99 vascular plants from Kuopio Museum, Finland as gift, 25 herbaria were prepared (Botany); 17 first day covers, stamps and brochures were received as gift from Philatelic Bureau (Numismatics) and added to the respective collections.

In Districts:

Pudukkottai:

Two specimens of chameleon and tortoise, a wooden plate from *Chettinadu* and a copper coin (*Amman kasu*, 19th Century AD) of Thondaimans of Pudukkottai were added to its collection.

Salem:

House registration documents belonging to 1867 and 1872, Queen Victoria and East India Company period, 8 silver coins and 4 duly cancelled stamped covers of Queen Victoria, George V, VI and Edward VII, a one rupee silver coin of Arcot Nawab and a Maria

Terasa silver coin of Austria were received as gift from Thiru S. Ansar of Harur.

An unfinished stone sculpture of Mahatma Gandhi was collected from Mallasamudram and displayed in the museum campus.

Madurai:

11 copper coins of Pandyas and Nayaks from Thiru K. R. Thangaraj of Madurai, 27 first day covers and brochures from Postal Department, and a stone scultpure of Kali (13th century A.D.) found at the Madurai Vaigai river bed were added to its collections.

Tiruchirapalli:

9 paper currencies of Egypt, Philippines, Jordan, Quait, Bangladesh and Pakistan were received as gift from Thirumathi. Fathima and added to its collections.

Vellore:

Oil pot from Thiru. Mannu of Arakkonan, a wooden pot from Thiru. Syed Ahmed of Vellore and a copper coin of Sambuvarayar period from Thiru. K. Duraisamy of Vinnamangalam were added to the museum as gift.

Erode:

100 stamps of various countries were received as gift from Thiru P. Arivalagan of K. S. R. Enginnering College. A three feet long *Varanus (udumbu)* was collected preserved and displayed in the Gallery.

Krishnagiri:

A stone inscription of Vijayanagar period (5' 9" x 3' 3") and a broken hero stone (3'x2' 9") from Emakkalnatham were added to the museum as field collection.

Herostone

Udhagmandalam:

About 150 years old stone mortar was received and added to the Museum.

Coimbatore:

Two dry specimens of jack fruit, a bamboo knife of Kadar tribe, a piece of "*Bhoj* Pathar" (bark), a wooden tapping tool and a leg band made of fibre were added to its collections.

Cuddalore:

A stone sculpture of *Garuda* (2.25 feet) belonging to 10th century AD from Thiruvathigai village, one Narasimha and two fully damaged Vishnu stone sculptures were added as field collections. A crusher made of stone from Thiru. Seeni Ramanujam of Thivathigai, animal paintings and a monkey made of coconut shell from Thiru. Ranjit were added as gift to the museum collection.

Tirunelveli:

Forty four specimens like sponges, corals, sea horses, molluscan shells etc., collected from the seashore at Tuticorin, Muttam, Tiruchendur and Kanyakumari were preserved and displayed in the museum.

One young shark from Thiru. D. Augustine of Palayamkottai, 15 Herbaria of medicinal plants from Prof. S. Somasundaram of Siddha Medical College, 51 stamps and 27 first day covers from Postal Department were added to its collection.

Kanyakumari:

30 stamps, first day covers and folders from Postal Department, a floral motif batik painting from Thiru. Venkat Rao and 5 photographs of freedom fighters were collected and added to its collection.

Palani:

Eighty two first day covers and brochures, sixteen tribal objects including a wooden vessel and a walking stick, two weaver bird nests, two sea horses, a cow fish, three snake specimens, four sea fishes, one piece of whale bone, one iron cannon ball, one frog's skeleton, a thousand rupee Indian paper currency (printed one side in 1947), a sample of *Navapashanam*, and a balance used to weigh jewels were added to its collection

Sivaganga:

Seventeen first day covers from Philatelic Bureau, an *Amman* wood carving, stone sculptures of *Podhaguru* Maharaja II, the V Zamin (1948-1863 AD), and his two consorts, one bundle of modern period palm-leaf manuscripts, brass coin of king George V, 250 ml terracotta oil container (200 years old), photographs of Jacquelin Kennedy and Jawaharlal Nehru, one silver and 5 brass coins of foreign countries, a portion of an ornamented beam, and a horse memorial stone were collected as gift from various persons of the district and added to its collections.

Tiruvarur:

Three floral designed wood carvings (100 years old) from Thiru Rajaneethithasan, seven wooden dolls, 3 stone lamps, a decorated stand and 8 conches from Thirumathi. Babi Kamalambal, forty one modern foreign coins and paper currencies were added to its collection.

Nagapattinam:

Three modern brass lamps (8 cm) from Thiru M. S. Mujipho Shark were received as gift and added to its collection.

Kanchipuram:

Plaster cast models of digestive, respiratory, nervous systems, head and mouth parts of a cockroach each of size 13.5 X 13.5 inches, 18 bivalve shells, 50 stamps belonging to India and other countries and 10 Raja Raja Chola copper coins were added to its collection.

Ramanathapuram

10 coins of India, America, Singapore, Malaysia and Arab from Thiru. Suryamurthi; two different species of Tiger prawn from Thiru. Krishnan; 10 stamps on flowers of cactus from Thiru. Krishnan; 10 palm leaf manuscripts from Thiru. Virapandi; a *kanchira* (musical instrument) from Thiru M. Muruganandam were added to the museum collection.

Karur:

A brass Nataraja (13 x 10 cm) from Thirumathi. Vasuki Murugesan, MLA, Karur, 27 copper coins of East India Company (18th-19th Century AD) and a brass ring like seal from Prof. Rajasekarathangamani were received as gift and added to its collection.

VIP VISITS

In Chennai

Hon'ble Minister for Tamil Official Language, Tamil Culture, Hindu Religious and Charitable Endowments, Dr. M. Tamizhkkudimagan paid a visit to the museum on 14.8.2000 to inaugurate the fountain and illumination of the National Art Gallery Building and fibre glass models of Dinosaurs.

Thiru M. Christophe Le Du, Director, Alliance Franchaise paid a visit to the museum on 5.9.2000. Thiru YAHFAT, Cultural Counselor, French Embassy, New Delhi visited Museum on 8.9.2000.

In Districts:

Thiru. Jogendra Patra, I.A.S., Secretary, Food Supply and Consumer Welfare Department, Government of Orissa visited the Government Museum, Uthagamandalam on 10.5.2000.

District Collector of Tirunelveli, Thiru. K. Dhanavel, I.A.S., paid a visit to the Tirunelveli Government Museum along with Thiru.

S. Mohammed Kothar Moideen, MLA of Palai constituency and other district officials on 2.8.2000.

RESEARCH FACILITIES AND LOAN OF OBJECTS

In Chennai:

Research facilities were rendered to the following persons for their research:

Thiru. C.D. Solanki (Cannons), Thiru. Nadana Kasinathan (Pallava Sculptures), Ms. Rama Narayanan (Textiles) (Archaeology Section).

Research facilities were offered to Thiru. J. Govindaswamy (South Indian silver coins), Thirumathi. Gnanasoundari (Symbols of coins) (Numismatic Section).

Research facilities were offered to Dr. D. B. James, Scientist, C.M.F.R.I (Moleskins), Thiru P. L. Kumaran, Research Fellow, Barcelona University, Spain (Marine Mammals) (Zoology Section).

Four students from Anna University were helped to undertake conservation of building and one Ph.D. Research Scholar was guided to pursue research in conservation of coins (Chemical Conservation and Research Laboratory).

Details about *Kurinji* plants and Mushrooms were given to Etymology Department, Chennai (Botany Section).

Dress and the ornamental sword of Sheriff of Chennai were displayed in the exhibition on "50 years of the Supreme Court and the Indian Legal System" at Queen Mary's College, Chennai organised by The High Court, Chennai from 5.8.2000 to 19.8.2000 (Children's Museum).

Study materials and loan specimens of Numismatics, Botany, Zoology and Geology were given to Singarampillai Matriculation

Higher Secondary School, Villiwakkam and Jain Singhvee Matriculation School, Triplicane for exhibitions and received back.

In Districts:

Pudukkottai:

Research facilities were offered to M. Saravanan (Viralimalai: A Study), M. Prema (Irrigation Under the Thondaimans of Pudukkottai) and S. Ravi Sankar (Cave Temples in Pudukkottai), M.Phil. students of Pudukkottai, Dr. Sivaprakasam Professors of History, Pushpam College, Poondi and Prof. S. Nazirudeen, Kadar Mohideen College, Athiramapattinam.

Madurai:

Research facilities were rendered to Selvi. Subasri (Hero Stones), Thiru. C. Lakshmanan (Inscriptions), Prof. Thirumathi. Meenakshi (Inscriptions) and Dr. Bedi (Brahmi Inscriptions).

Tiruchirappalli:

Research facilities were rendered to Thiru. C. Xaviour (Excavations in Trichirapalli), Thiru. A. Jerold Benetic (Rani Mangammal and her period) and Ms. P. Amudhaveni (Gangaikonda Cholapuram and Inscriptions).

Erode:

Research facilities were rendered to Thiru. Jothi Backiam (Erode Municipality), Thiru. Abdul Gani (South Indian Tribes), Thiru. Nal Natarasan (Stone Inscriptions of Erode District).

Udhagamandalam

Research facilities were rendered to Thiru. Kumarasamy (Hero Stones of Nilgiris).

Coimbatore:

Research facilities were rendered to Thiru. C.N. Krishnan (Wood carvings), Thiru. Stalin (The Theories of Incest), Dr. R. Kannan, I.A.S., (Rock Art Depictions', 'The Inter-relationship of Symbols of the Indus-Valley Civilisations and the Rock Art

Paintings'), Thiru. Karthikeyan (Fossil Impressions), Prof. Allen Zagarell, Professor of Anthropology, U.S.A., (Rock Arts, Hero Stones and Inscriptions), Dr. R. Nagaswamy (Documentation of Three Chola Period Bronzes)

Cuddalore:

Research facilities were rendered by providing relevant source materials to Thiru. K. Jothilingam, Thiru. Annadurai and Thiru. Raja to pursue their research.

Tirunelveli:

Research facilities were rendered to Thiru R. Sundar and Thiru D. Dennis (History, Types and Distribution of Coins), Thiru V. Sugumar (Builder of Krishnapuram and its Sculptures).

Krishnagiri:

Facilities were rendered to five college students from Bangalore (Historical Aspect of Dharmapuri District) and students of Krishnagiri Women's College (Medicinal plants).

Sivaganga:

Facilities were rendered to the Assistant Central Intelligence Officer, Sivaganga on 'Marudhu Pandiar'.

Nagapattinam:

Research facilities were rendered to Thiru. K. Satchilingam, Research Student, Tamil University, Thanjavur (Archaeology).

Ramanathapuram:

Research facilities were rendered to Thiru. Subramanian (Kollimalai Tribes), Thiru. Keerthivasan (Sethupathy Coins), Thiru. Elangovan (Nataraja in Uttarakosamangai'), Thiru. Ananda Kumar, Asst. Judge of Ramanathapuram (Musical Instrument – *Yazh*)

Karur:

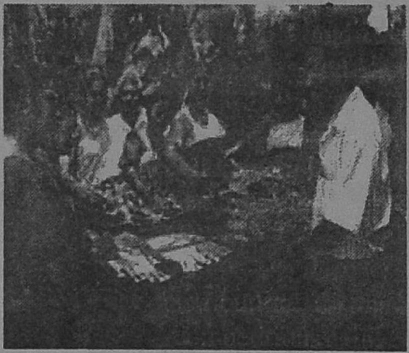
Research facilities were rendered to the students of Government Arts College, Karur (Inscriptions and Palm-leaf Manuscripts).

TRAINING COURSES, COMPETITIONS AND CELEBRATIONS

The following training programmes, courses, competitions and celebrations were conducted at the Government Museum, Chennai and districts.

22.04.2000 'Aimperum Vizha' – Competitions on *kolam, painting, dance, oratory* and *kural recitation* in Government Museum, Salem.

26.04.2000-30.04.2000



'Batik Art' – training course for 20 ladies in Governmet Museum, Madurai.

04.05.2000-01.06.2000 'Care of Art Objects' – Training course for artists in Government Museum, Chennai (Chemical Conservation and Research Laboratory)

01.06.2000 - 30.06.2000 'Care of Museum Objects' – Training course in Government Museum, Chennai (Chemical Conservation and Research Laboratory)

26.06.2000

'Conservation of Art Objects' – Training for Stella Maris College Fine Arts students. Their services were utilised for reorganising the Archaeological Storage in Government Museum, Chennai (Archaeology Section and Chemical Conservation and Research Laboratory.

27.06.2000 'Painting and Essay Writing Competitions' for school children on 'Environment and Pollution' in Government Museum, Cuddalore.

05.07.2000 'Prize Distribution' for the winners of Painting and Essay competitions in Government Museum, Cuddalore.

17.07.2000 - 20.07.2000 Screen-Printing – Training course was conducted in collaboration with *Rangoli* Screens, Virudhunagar for 50 students in Government Museum, Madurai.

17.07.2000- 26.07.2000 'Training on Epigraphy' for 70 college students in Government Museum, Salem

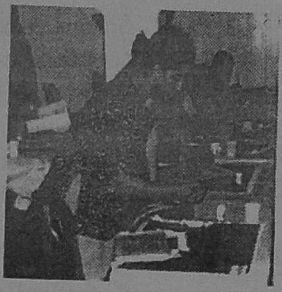
10.08.2000 'Inscription' – one day Training Camp for the benefit of the college students in Government Museum, Palani.

11.08.2000-18.08.2000	'Importance of Geological Specimens' – fourth training course in Government Museum, Chennai (Geology Section)
12.08.2000	'Painting Competition' at C.S.I. Boys Higher Secondary School, Erode, organised by the Government Museum, Erode
15.08.2000	Independence Day Celebrations in Government Museum, Erode
15.08.2000	Independence Day Celebrations in Government Museum, Salem
04.09.2000	'Painting Competition' for 340 students from 34 schools in Government Museum, Tiruvarur

SEMINARS, WORKSHOPS, CAMPS AND LECTURES:

The Department of Museums conducted the following seminars, workshops, camps and lectures in Chennai and districts.

21.05.2000-26.05.2000	Workshop on 'Painting' organised in collaboration with National Folklore Support Centre (NFSC), Chennai in Government Museum, Chennai (Education and Art Sections)
03.07.2000-08.07.2000	Workshop on 'Kalamkari' organised in collaboration with National Folklore Support Centre (NFSC), Chennai in Government Museum, Chennai (Art and Education Sections)



05.09.2000- 10.09.2000	Workshop on 'Madhubani Paintings' organised in collaboration with National Folklore Support Centre (NFSC), Chennai in Government Museum, Chennai (Education and Art Sections)
12.09.2000	One day workshop on 'Estampaging of Inscriptions' for Archaeology and Museology Undergraduate students in Government Museum, Pudukkottai.
05.09.2000	'Tamil God Muruga : History and Philosophy' – a Book Review organised by the Curator, Government Museum, Coimbatore under the auspices of Tamizh Neyam and Tamizhosai Pathipagam, Coimbatore

PRESENTATION / PARTICIPATION IN SEMINARS / WORKSHOPS:

In Chennai:

Dr. R. Kannan, I.A.S., Commissioner of Museums

28.04.2000	Special lecture in the inauguration of the Conference of the Epigraphical Society of India and Place Name Society of India at Erode.
29-04-2000- 30-04-2000	Participated in the All India Museum Conference as panelist for discussions.
22.06.2000	International Laws to Protect Intellectual Properties-Lecture in the Workshop organised by the Institute of Asian Studies, Chennai on 'Protection of Intellectual and Cultural Property Rights".

Thiru K. Lakshminarayanan, Curator, Education Section

23.06.2000	Indian Laws Protecting Cultural Properties- Lecture in the Workshop organised by the Institute of Asian Studies, Chennai on 'Protection of Intellectual and Cultural Property Rights".

Dr. V. Jeyaraj, Curator, Chemical Conservation and Research Laboratory

28.04.2000	Preservation of Stone Inscriptions and Related Materials – Paper presented in the Conference of the Epigraphic Society of India in Erode.
29.04.2000	"Challenges of the Conservators in Museums" paper presented in the Annual Conference of the Museums Association of India in Trissur, Kerala. He was one of the Panel Members in two panel discussions.
23 .05.2000	'Conservation of Thanjavur Paintings' – Resource person in the Workshop conducted on Thanjavur Paintings.
20.06 .2000	1. Legislative Measures to Protect Cultural Properties 2. New Techniques of Conservation of Cultural Properties – Lecture demonstration in the Workshop organised by the Institute of Asian Studies, Chennai on 'Protection of Intellectual and Cultural Property Rights".
21.08.2000	'Monuments in Tamil Nadu' – Paper sent to the Tamil Nadu History Congress conducted at Kodaikanal.

Thirumathi. R. Santhi, Curator, Numismatic Section

August 2000	'Unidentified Copper Coins' – Paper was sent to the IX South Indian Numismatic Society Conference held at Darwar, Karnataka.

In Districts:

Dr. J. Raja Mohamed, Curator, Government Museum, Pudukkottai

19.08.2000-20.08.2000	"Maritime Trade Information in the Copper Plates of Sethupathis" – article presented in the 10th Conference of the Tamil Nadu Archaeological Society, Thanjavur.
23.09.2000-24.09.2000	Coramandal Textiles in the Museums in Europe – A Study as Indigenous Source Materials – article presented in the Tamil Nadu History Congress, Kodaikanal

Dr. C. Maheswaran, Curator, Government Museum, Coimbatore

30.08.2000	"The Indigenous Knowledge System of the Tribes of the Nilgiris Bio-Sphere Reserve Zone" – article presented in the Environmental Awareness Workshop held for the teachers of the Gudalur taluk at Bundipur National Park under the joint auspices of CPR Environmental Education Centre and the Biological Protection Trust.

Thiru. M. Gandhi, Curator, Government Museum, Vellore

22.08.2000	Appukkal Treasure-trove Swords- paper presented in the 10th Conference of the Tamil Nadu Archaeological Society, Thanjavur.
23.09.2000	Pangalanad-paper in the Tamil Nadu History Congress 8th Annual Conference at Kodaikanal

Thiru C. Govindaraj, Curator, Udhagamandalam

19.08.2000-20.08.2000	'Indus Culture Belongs to Tamilians' – An Architectural Evidence' (in Tamil) paper presented in the 10th Conference of the Tamil Nadu Archaeological Society, Thanjavur.

22.09.2000- 24.09.2000 "Origin of Dravidian Order Pillar" – paper presented in the Tamil Nadu History Congress 8th Annual Conference at Kodaikanal

Thiru N. Sundararajan, Curator, Government Museum, Cuddalore

03.09.2000 - 24.09.2000 'Sivagangai Velu Nachiyar's Tamil Inscription' – paper presented at Tamil Nadu History Congress 8th Annual Conference held at Kodaikanal.

PARTICIPATION IN WORKSHOPS, EXPERT COMMITTEES, SEMINARS ETC.:

22.09.2000- 24.09.2000 'Care of Amphibians in Captivity' – workshop organised and conducted at Arignar Anna Zoological Park – Thiru. P. Jawahar, Curator, Zoology Section participated.

19.06.2000- 24.06.2000 'Intellectual and Cultural Property Rights' – workshop organised and conducted at the Institute of Asian Studies, Chemmancheri, Chennai – Tvl. J.R. Asokan, K. Sekar, N. Sundararajan, K. Saravanan, Curators and Thirumathi. C. Prema Deepa Rani, Gallery Guide participated.

19.04.2000 - 21.04.2000 Participated as a member of the 'Screening and Evaluation Committee' of the Government of India to evaluate the bronzes, sculptures and other art materials, which are proposed to be sent for an exhibition to be held in France – Thiru R. Balasubramanian, Curator, Archaeology Section.

29.04.2000 Participated in the All India Museums Association Conference at Trissur-Thiru. M. Gandhi, Curator, Government museum, Vellore.

28.04.2000- 30.04.2000 Participated in the conferences of the Place-names Society and Epigraphical Society of India– Thiru J. Mullai Arasu, Curator, Government Museum, Erode.

05.09.2000	*"Thamizh Kadavul Murugan: Varalarum Thathuvamum"* – Book releasing function at Coimbatore – Thiru C. Govindaraj, Curator, Government Museum, Udhagamandalam.
27.08.2000-28.08.2000	Kanyakumari District Peace Trustee Committee – Conference and Seminar namely *Matha-Ina Kalavarangal* – Thiru N. Soundarapandian, Curator, Government Museum, Kanyakumari participated.

POPULAR LECTURES AND SPECIAL LECTURES:

Popular Lectures:

In Chennai.

20.04.2000	"Heralding the Mathematic Year 2000 through Cultural Environment for Mathematics" – Thiru P.K. Srinivasan, Curator-Director, Ramanujan Museum and Maths Centre, Chennai-600113.
31.05.2000	"India's Natural Resources' – Thiru C.S. Kuppuraj, Chief Engineer, PWD (Retired), Government of Tamil Nadu.
28.06.2000	"Indus Script" – Dr. R. Madhivanan, Chief Editor, Tamil Etymological Dictionary Project, Chennai-8.
20.07.2000	Who Owns Bio-diversity: Man and Plants Relationship – Prof. (Dr.) Dayanandan, Head of the Department of Botany, Madras Christian College, Chennai-50.
21.08.2000	"Entrepreneurial Culture" Dr. R. Jayaraman, Professor and Head, Department of Entrepreneurship Studies, Madurai Kamaraj University.
26.09.2000	"Cultural Relation Between India and South East Asia" – International Women's Association Endowment Lecture series in Government Museum, Chennai – Dr. K.V. Raman. Professor of Archaeology (Retired.) University of Madras.

In Districts

05.06.2000	"The Problems of Environment, Which We Meet"- Thiru. Guru Arumugam, Deputy Secretary, Salem District Naturopathy Doctors Association, Salem
21.06.2000	"The Art in Erode District" – Thiru. K. Sridhar, Public Relations Officer, Tamil Nadu Artist Association, Erode
05.07.2000	"Indo-Danish Coins"- in the lecture series of Later Indian Coins – Thiru. M. Kandasamy Numismatist, Tiruchirappalli.
11.07.2000	'The Population Explosion and Employment' – Er. M.S.S. Ravi, General Manager, District Industrial Centre, Salem.
24.08.2000	"Indo-Dutch Coins" – in the lecture series of Later Indian Coins – Thiru M. Kandasamy Numismatist, Tiruchirappalli
21.09.2000	*Salem Maavatta Urum Perum*-Thiru. Tharai Kumaravel, Salem.
24.09.2000	"Herbal Medication" – Siddha Medicines – Thiru. Somasundar and Thiru. Vishnudev, Professor Velusamy, Govt. Arts College, Krishnagiri.
27.09.2000	"Journalism and Development of Tamil Journals" – Thiru. Vairamalai Anthonysamy – Editor, Vairamalai Magazine, Tiruchirappalli
30.08.2000	"*Thonmai Chirappukal*" (Tamil) – Thiru. K. Palaniyandi, Tamil Teacher, Tiruvarur.

SPECIAL LECTURES FOR THE TRAINEES:

In Chennai:

Course on *Care of Museum Objects*

01.06.2000	'Introduction to Conservation' – Thiru. N. Harinarayana, former Director of Museums.
08.06.2000	'Conservation of Monuments' – Thiru. K. T. Narasimhan, Superintending Archaeologist, Archaeological Survey of India, Chennai Circle.

10.06.2000 'Care of Wall Paintings' – Thiru.B.K. Mukhopadhyaya, Assistant Superintending Archaeological Chemist, Archaeological Survey of India, Chennai Circle.

14.06.2000 'Conservation of Monuments' – Dr. B. Narasimiah, Retired. Superintending Archaeologist.

16.06.2000 Care of Leather Objects- M. Ray Chaudhary, Retd. Scientist, Central Leather Research Institute, Chennai.

23.06.2000 'Finger Printing of Bronzes' – Thiru B. Venkataraman, Scientist, Indira Gandhi Centre for Atomic Research, Kalpakkam

23.06.2000 'Care of Archaeological Collections"- Dr.V. N. Srinivasadesikan, Retd. Assistant Director of Museum

Course on *Importance of Geological Specimens*

11.08.2000 Geology in the Services of Man-Prof. R. Srinivasan, Department of Applied Geology, University of Madras.

Pre-history of Tamil Nadu-Thiru. Thirumurthy, Archaeological Survey of India, Chennai.

12.08.2000 Excavation at Alagankulam-Thirumathi. Vasanthi, State Department of Archaeology, Chennai.

Marketing Aspects of Granites-Thiru. R. Purushothaman, Marketing manager, TAMIN, Chennai.

13.08.2000 Geology and Archaeology-Thiru. S. Sreekumar, State Department of Archaeology, Chennai.

Mineral Wealth of Tamil Nadu-Thiru. D. Vasudevan, Director, Geological Survey of India, Chennai.

16.08.2000 Uses of Geology in Archaeology- Prof. Dr. P. Shanmugam, Head of the Department of Ancient History, University of Madras, Chennai.

17.08.2000	Importance of Geological Specimens-Thiru. Somnath Babu, Manager, TAMIN, Chennai. Granites Prospecting-Thiru. J. Purushothaman, Gem Granites, Chennai. Monuments of Tamil Nadu. Thirumathi. Satyabhama, Deputy Superintending Archaeologist, Chennai.

In District:

17.07.2000- 26.07.2000	'Inscriptions' – Dr. S. Raju, Pulavar, R. Duraisamy and Thiru S. Rajavelu

Following popular and special lectures were delivered by the Curators of the Chennai and District Museums.

In Chennai:

Thiru K. Lakshminarayanan, Curator, Education Section

22.05.2000	Lecture in the Training Programme on Paintings-Government Museum, Vellore
23.05.2000	Thanjavur Paintings, Workshop on Thanjavur Paintings, Government Museum, Chennai
17.07.2000	Special lecture in the Training Programme on Epigraphy, Government Museum, Salem.
16.06.2000	Educational Activities and Courses-Care of Museum Objects, Training Course. Chennai.
05.07.2000	Kalamkari Paintings in the Workshop on Kalamkari Paintings, Government Museum, Chennai.
16.08.2000	Indian Stones and Art Schools-Importance of Geological Specimens, Training Course, Chennai.
06.09.2000	Madhubani Paintings in the Workshop on Madhubani Paintings, Government Museum, Chennai.

Dr. V. Jeyaraj, Curator, Chemical Conservation and Research Laboratory.

01.06.2000-
30.06.2000
	'Preventive Conservation'
	'Documentation in Conservation'
	'General Principles of Conservation'
	'Traditional Methods of Preservation'
	'Care of Organic Objects'
	'Care of In-organic Objects'
	'Paintings and their Constitution'
	`Care of Paintings`
	'Care of Packing and Transportation'
	'Photography and Care of Photographs'
	'Pest Control in Museums'
	'Care in Storage – Special lectures delivered during the training course of 'Care of Museum Objects'
	`Paintings and their Care`

06-07-2000	Kalamkari Paintings and Their Care-Workshop on Kalamkari Paintings
17.08.2000	'The Role of Chemistry in the Preservation of Geological Specimens' – lecture delivered in the Course on "Importance of Geological Specimens"

Thiru P. Jawahar, Curator, Zoology Section:

13.06.2000	'Care of Zoological Collections' – delivered in the Course on "Care of Museum Objects"

Thiru M. Mohan, Curator, Contemporary Art Gallery

07.05.2000	'Painting Collections and its Features' – lecture delivered in the "Museology Workshop" at Government Museum, Chennai
23.05.2000	`Thanjavur Paintings in the Chennai Museum and Their Features"-lecture delivered in the Workshop on Thanjavur Paintings

04-07-2000	"Kalamkari Paintings in the Chennai Museum and heir Features"-lecture delivered during the Workshop on "Kalamkari Paintings"
15-08-2000	"Different types of Fossils" – lecture delivered in this connection "Importance of Geological Specimens"
09-06-2000	"Painting Collections"-lecture delivered in the course on "Care of Museum Objects"

Thirumathi. R. Shanthi, Curator, Numismatics Section

09.05.2000	"An introduction of Coins"-Special lecture in the "Museology Workshop" Government Museum, Chennai

Thiru. D. Jawahar Prasadraj, Curator, Geology Section

16.06.2000	Care of Geological Specimens-Care of Museum Objects-Training Course.
26.08.2000	Principal Exhibits in the Geology Gallery-Importance of Geological Specimens –Training Course.

Thirumathi. M. N. Pushpa, Curator, Botany Section

19-06-2000	'Care of Botanical Collections' – Lecture delivered in the course on Care of Museums Objects
10-05-2000	'Preservation of Botanical Specimens' – Lecture delivered in the Museology Workshop

Thiru J. R. Asokan, Curator, Design and Display

19-06-2000	'Display and Exhibition Techniques' – Lecture delivered in the course on Care of Museums Objects

In Districts:

Dr. C. Maheswaran, Curator, Government Museum, Coimbatore

08-04-2000	'Privileged position of Art in the Society' (in Tamil)- Special lecture in the inaugural function of the Art Society in the Tamil Nadu Agricultural University, Coimbatore

Thiru. N. Sundararajan, Curator, Government Museum, Cuddalore

02-08-2000	'Sculptures of Tamil Nadu'-Special lecture during the inauguration of the History Department, History Association –St. Joseph's College
10-08-2000	'Museums' – at Valliammal Vidyalaya School, Cuddalore

Thiru N. Soundrapandian, Curator, Government Museum, Kanyakumari

18.07.2000	'Museum and Pupil'-lecture delivered in the camp organised by the District National Service Scheme students at Vivekananda Kendra, Kanyakumari.

RADIO-TALKS/TELEVISION PROGRAMMES:

20.05.2000	*Vazhibadum Panbadum* (Tamil), All India Radio, Chennai, Dr. R. Kannan, Ph. D., IAS, Commissioner of Museums
18-04-2000	"*Heritage* of *Kongu Region*" (Tamil) All India Radio, Coimbatore – broadcasted thrice during July-August and September 2000-Dr.C.Maheswaran, Curator, Government Museum, Coimbatore
28-04-2000	'Tourism Information – Government Museum, Madurai' (Tamil) in all India Radio, Madurai – Thiru P. Sam Sathiaraj, Curator, Government Museum, Madurai

20-07-2000	'A Day in Government Museum, Kanyakumari' (Tamil) in All India Radio, Tirunelveli – Thiru .N. Soundara pandian, Curator, Government Museum, Kanyakumari
21-09-2000	"Government Museum, Erode" – A special programme in Erode Television – Thiru J. Mullai Arasu, Curator, Government Museum, Erode

RENOVATION AND IMPROVEMENTS TO THE MUSEUMS/GALLERIES

Government Museum, Chennai

Archaeology Section:

Acrylic sheet enclosures were made and fixed for the important bronzes in the Bronze Gallery to avoid dust, human touch and moisture. Amaravati Sculptures, Jain Bronzes and Sculptures were photographed and documentation work was carried out.

Zoology Section:

'Diorama' display arrangements in two showcases renovated and stuffed specimens of Sambar and Hyaena were redisplayed.

Botany Section:

30 Herbaria mentioned in the *Sangam* literature were displayed in three showcases of the systematic Botany Gallery.

Anthropology Section:

Re-organizing work of the Anthropological Gallery continued. Conservation work on displayed objects was carried out.

Numismatics Section:

Showcase on 'Medals' was re-organised. Plaster cast models of historical medals of Mysore and Victoria Cross medals with photographs were displayed

Geology Section:

One showcase was renovated along with dioramic display arrangements. Geological specimens were redisplayed for public view.

National Art Gallery and Contemporary Art Gallery:

'Sir Eyre Coote', 'Lord Bentick', 'Lord Napier'-three British Portrait Paintings and a poster colour painting 'Fisher Woman' were conserved and re-displayed in the respective galleries.

Children's Museum

In the civilization Gallery, Semi-dioramic display arrangements of Chinese Civilisation, Greek Civilization and Ancient *Tamilagam* were reorganized.

In the Physical Science Gallery 12 electronic gadgets were prepared, displayed and changed fortnightly to explain the basic principles of electricity and electronics.

Design and Display Section:

Works related to Part II scheme projects for the year 2000-2001 like setting up special lighting and storage facilities to Contemporary Art Gallery and National Art Gallery, creating a Website, purchase of lighting equipment, computers were carried out.

Education Section:

Guide lectures to school and college students were arranged and educational activities of the museum were coordinated. VIP visits were handled. popular lectures, workshops and special lectures for the benefit of scholars, students and general public were arranged successfully.

In Districts:

Pudukkottai:

The Public Works Department is attending to the replacement of floor with polished tiles in the galleries including some minor repairs to the buildings to the tune of Rs.2.00 lakhs.

Madurai:

4 Panel boards of size 7' x 4' to exhibit paintings, and a new museum name board were prepared and displayed. Improved lighting arrangements were done in the Zoological Gallery.

Tiruchirapalli:

The work of making new showcases for Rs.1.00 lakh under part II scheme is under progress. The work to the tune of Rs.4.00 lakhs for strengthening the security in the museum building is also in progress with the help of Public Works Department.

Vellore:

Bronze icons, coins, craft items, swords and natural history specimens were displayed in new showcases.

Coimbatore:

The hut model of Kadar-tribe's has been reorganised and reconstructed. A specimen of *Bhoj Pathar* Bark was prepared for display.

Cuddalore:

Some of the house hold articles used in the last century like *Ammi (grinding stone)*, vessel made of soap stone, alarm time piece stand and *veesai* (weighing stone) were displayed in a showcase.

Tirunelveli:

All the galleries were re-organised in the newly occupied Heritage building and the District Collector, Thiru K. Dhanavel, I.A.S. opened the museum for public view in the new premises.

Kanyakumari:

Terracotta toys were displayed in a newly purchased showcase. N.S.S. camp was organised to clean up the museum campus.

Krishnagiri:

A showcase was renovated and photographs of Forts of Dharmapuri were displayed. Recently collected stone inscription, hero stone and laminated photographs of Krishnagiri forts were displayed.

Nagapattinam:

New pedestals were made for displaying stone sculptures. Three interactive working models were repaired. Museum publications were displayed in the Museum Publication showcase.

Kanchipuram:

Showcases with newly prepared/acquired plaster cast models, coins, wood carvings, animals in scrub jungle were re-organised.

EXHIBITIONS:

In Chennai:

26-05-2000- 25-06-2000	Thanjavur Paintings – Contemporary Art Section & Education Section
01-06-2000	Restored Paintings of Madras Christian College – Chemical Conservation and Research Laboratory

30-06-2000- 06-07-2000	Care of Museum Objects-Cemical Conservation and Research Laboratory	

07-07-2000- 11-07-2000	'Kalamkari Paintings' - Contemporary Art Section & Education Section
12-07-2000- 14-07-2000	Medicinal Plants – Botany Section in collaboration with Siddha Medical College (Staff and Students)
18-08-2000	'Importance of Geological Specimens" – Geology Section
06-09-2000- 11-09-2000	'Madhubani Paintings' - Contemporary Art Section & Education Section

In Districts:

22.05.2000- 05.06.2000	Special Exhibition on "Paintings drawn in the Summer Training Camp-Government Museum, Vellore.
14-06-2000- 22-06-2000	'Batik Art Exhibitions' – Government Museum, Madurai
05-07-2000- 04-08-2000	'Indo Danish Coins' – Government Museum, Tiruchirapalli
24-08-2000- 23-09-2000	'Indo-Dutch Coins'-Government Museum, Tiruchirapalli
30-08-2000- 31-08-2000	'Coins' – (1500 Coins charts, paper cuttings, charts, photos, exhibitions – Special lecture by Prof. K. A. Thirugnanasambandam, Director, Kongu Numismatic Research Centre, Erode-Government Museum, Salem
01-09-2000- 15-09-2000	'Swords of Appukkal Treasure-trove' – Government Museum, Vellore
24-09-2000	'Siddha Medicinal Herbs' – Government Museum, Krishnagiri

CHANGE OF LOCATIONS OF MUSEUMS:

01-04-2000 Government Museum, Tirunelveli was shifted to Saint Mark's Road, Near Water Tank, Samathanapuram, Palayamkottai, Tirunelveli-627 002.

PUBLICATIONS:

During the year 1999-2000, 7 books published and 15 books were reprinted and brought to the Sales Counter. During the period, April to September 2000 the following books were published:

1. Documentation on the Cannons in the Government Museum, Chennai (Bulletin)-Dr. R. Kannan, Ph.D., I.A.S., Commissioner of Museums and Thiru R. Balasubramanian, Curator, Archaeology.

2. Holistic Approach to Dating in Ancient Indian History especially Indian History (Monograph) –Dr. R. Kannan, Ph.D., I.A.S., Commissioner of Museums .

3. Report on the Restoration of Oil Paintings from Madras Christian College – Dr. V. Jeyaraj, Curator, Chemical Conservation & Research Laboratory, Government Museum, Chennai.

4. Whales - (Tamil) Booklet –Thiru. J. R. Asokan, Curator, Design and Display Section, Chennai.

5. Museum Journal (Tamil & English, May 2000)-Editors Dr .V. Jeyaraj and Thiru. K. Sekar

6 Cultural Relation between India and South East Asia Dr. K.V.Raman.

LIST OF PUBLICATIONS AVAILABLE ON SALE IN CHENNAI AND DISTRICT MUSEUMS:

Sl. No	Titles and Authors	Price Rs.
1.	Descriptive Catalogue of Butterflies In The Collection of Madras Museum-*S. Thomas Satyamurti*	231.00
2.	The Echinodermata In The Collection of Madras Government Museum- *S. Thomas Satyamurti*	36.40
3.	The Wild Ferns Of Madras City And Its Immediate Neighbourhood-*M.S. Chandrasekar*	7.10
4.	The Birds' Eggs And Nests In The Collection Of The Madras Government Museum- *S. Thomas Satyamurti*	43.95
5.	Grasshoppers In The Collection of The Government Museum-*G. Kesavaram*	85.00
6.	Guide To The Bird's Gallery- *S. Thomas Satyamurti*	11.30
7.	பாலூட்டிகள் – *S. Thomas Satyamurti*	8.30
8.	Guide To The Principal Exhibits In The Geological Galleries-*E. George Jesudosan*	13.55
9.	Guide To The Important Monuments In And Around Pudukkottai-.*M. Raghupathy*	30.00
10	Guide To The Archaeological Galleries – An Introduction To South Indian Temple Architecture And Sculpture -*F. H. Gravely & C. Sivaramamurti*	25.00
11	Guide To The Buddhist Antiquities-*A. Aiyppan & P. R. Srinivasan*	30.00
12	Guide To The Anthropological Exhibits -*C. J. Jayadev*	39.00
13	Illustration of Indian Sculptures Mostly Southern for Use With the Guide To the Archaeological Galleries-*F. H. Gravely & C. Sivaramamurti*	25.00
14	Select Bronzes in the Madras Government Museum-*M. Raman, IAS.*	35.00
15	Guide To The Bronze Gallery -*V. N. Srinivasadesikan*	50.00

16	A Souvenir Released on the Occasion of The Exhibition on South Indian Bronzes *-M. Raman, IAS*	51.00
17	Amaravati Sculptures in the Madras Government Museum- *C. Sivaramamurti*	210.00
18	Nagapattinam and Other Buddhist Bronzes *- T. N. Ramachandran*	117.00
19	Adivasis of Kodiakkarai-*A. V. N. SARMA*	9.75
20	The Tali in Relation to South Indian Initiation Rites- *C. J. Jayadev*	7.55
21	Catalogue of Vijayanagar Coins in the Madras Government Museum- *N. Sankaranarayana*	74.00
22	Catalogue of Venetian Coins in the Madras Government Museum- *T. G. Aravamudan*	40.00
23	Catalogue of Venetian Coins in the Madras Government Museum – *N. Sankaranarayana*	25.00
24	The Harappan and the Vedic Cultures Musing On Some Moot Problems- *K. R. Srinivasan*	15.00
25	Bronzes of South India- *P. R. Srinivasan*	386.00
26	Flowering Plants of Madras City and its Immediate Neighbourhood- *P. V. Mayuranathan*	308.00
27	Coins of India Through Ages- *P. N. Mohandoss*	10.00
28	மருத்துவத் தர்வரங்கள் – *ம. ந. புஷ்பா*	10.00
29	Handbook of Madras Government Museum *-S. T. Satyamurti*	80.00
30	Notes on Hindu Images- *F. H. Gravely & C. Sivaramamurti*	12.00
31	Handbook of Preservation of Zoological Specimens-- *P. Jawahar*	10.00
32	சித்த மருத்துவத்தின் சிறப்புகள் – *ம. ந. புஷ்பா*	25.00
33	Handbook of Museum Technique-*A. Aiyappan*	71.00
34	Jain Sculptures-*R. Balasubramanian*	20.00
35	Medals -*N. Sankaranarayana*	31.50
36	Tiruchi Museum Stone Sculptures *-N. Sankaranarayana*	20.00
37	Catalogue of Prehistoric Antiquities	35.00
38	Small Handbook of the Government Museum	5.00

39	Folder	10.00
40	Catalogue of Musical Instruments *-P. Sambamoorthy*	35.00
41	Ancient Industries of Tamil Nadu	
42	The Adichanallur Skulls-*S, Zuckerman*	25.00
43	Sri Vaishnava Brahmins-*K. Rangachar*	100.00
44	Early Eastern and Chalukya Sculpture	70.00
45	Select Satavahana Coins-*M. Ramarao*	20.00
46	Excavation at Kilpauk-*M.D. Raghavan*	25.00
47	Scripts in and Around India- *V. Kannaiyan*	50.00
48	கலைச்செல்வங்கள் – *இரா. நாகசாமி*	50.00
49	Buddhist Sculpture from the Stupa Near Goli Village	40.00
50	Nayars of Malabar-*F. Fawcett*	35.00
51	Copper Plate Grants	40.00
52	List of Tombs-*Julian James Cotton*	110.00
53	Story of Buddhism - *A., Aiyappan and* *P. R. Srinivasan*	115.00
54	Report on the Socio Economic Conditions of the Tribes of Tamil Nadu	85.00
55	Nolamba Sculptures-*C. Sivaramamurti*	50.00
56	பெரியார் மாவட்டக் கோயில்கள் – *வே. ஜெயராஜ்*	70.00
57	Handbook on Preservation of Botanical Specimens- *M. N. Pushpa*	21.00
58	ஆவணங்கள் பாதுகாப்பு – *வே. ஜெயராஜ்*	15.00
59	Documentation on the Cannon in the Government Museum, Chennai-*R. Kannan, IAS., & R. Balasubramanian*	50.00
60	Guide to the Fish Gallery- *S. T. Satyamurti*	65.00
61	Guide to the Lizards, Crocodile, Turtles and Tortoises Exhibited in the Reptile Gallery *-S. T. Satyamurti*	55.00
62	Guide to the Galleries of Foreign Animals *- S. T. Satyamurti*	50.00
63	பழங்காலப் பண்பாடும் பழங்குடிகளின் பண்பாடும் –சி. ஜெ. ஜெயதேவ்	25.00
64	The Foote Collections of Indian Prehistoric and	200.00

	Protohistoric Antiquities- *Robert Bruce Foote*	
65	Puppets in the Collection of the Madras Government Museum- *N. Devasahayam*	55.00
66	Indian Epigraphy and South Indian Scripts	285.00
67	Centenary Souvenir, Government Museum, Chennai	175.00
68	Three Main Styles of Temple Architecture Recognised by Silpa Sastra	20.00
69	Beginnings of the Traditions of South Indian Temple Architecture	20.00
70	An Outline of Indian Temple Architecture	20.00
71	Guide to the Sharks Exhibited in the Reptile Gallery- *S. T. Satyamurti*	20.00
72	திமிங்கிலங்கள் –*ஜா. ரா. அசோகன்*	10.00
73	Holistic Approach to Dating in Ancient History Especially Indian History- *R. Kannan, IAS.,*	35.00
74	முதலைகள் –*ஜா. ரா. அசோகன்*	15.00
75	பாம்புகள் பற்றிய அறிவியல் செய்திகள் –*ஜா. ரா. அசோகன்*	20.00
76	Government Museum, Chennai – As a Research Institution-*N. Devasahayam & V. Jeyaraj*	35.00
77	Proceedings of the Seminar on Conservation of Cultural Heritage- *V. Jeyaraj*	15.00
78	Snakes-*J. R. Asokan*	10.00
79	Medicinal Plants Used in the Siddha System of Medicine- *M. N. Pushpa*	
80	An Introduction to the Chemical Conservation and Research Laboratory-*V. Jeyaraj*	5.00
81	Guide to the Invertebrate Galleries - *S. T. Satyamurti*	7.05
82	Handbook on Conservation in Museums -*V . Jeyaraj*	35.00
83	***Care of Museum Objects*** - *N. Harinarayana & V. Jeyaraj*	20.00
84	Restored Paintings of the Madras Christian College- *V. Jeyaraj*	15.00
85	ஈரோடு அருங்காட்சியகக் கையேடு – *வே. ஜெயராஜ்*	15.00

86	நாகப்பட்டின அருங்காட்சியகக் கையேடு – *வே. ஜெயராஜ், க. சரவணன்.*	10.00
87	நாகப்பட்டினம் அருங்காட்சியகம் – ஓர் கண்ணோட்டம் – *வே. ஜெயராஜ், க. சரவணன்*	25.00

ARTICLES PUBLISHED:

Dr. R. Kannan, Ph.D., I.A.S., Commissioner of Museums, Chennai

1 "Museum Management" – (English) Museum's Journal May 2000
2 "Museum: A Bridge Between Old Cities and New Cultures" – (English) Museum's Journal May – 2000
3 "Use of Modern Management Techniques Like Participatory Approach and Project Management for Establishment of New District Museums" – (English) Museum's Journal – May 2000 (Dr. R. Kannan and J. R. Asokan)

Thiru. K. Lakshminarayanan, Curator, Education Section

'Tribes in the History of Tamilnadu' – (Tamil) Museum's Journal – May 2000

Dr. V. Jeyaraj, Curator, Chemical Conservation and Research Laboratory

1 The Chemical Conservation and Research Laboratory and the Conservation services, Museum's Journal (Tamil), May 2000

2 'Paintings from Madras Medical College Restored', Chennai – Museum's journal (English) May 2000

3 'Conservation Services in Government Museum, Chennai – Museum's journal (English) May 2000

4 'Analysis of a Chinese Coin", Special Bulletin, Vol.VI-Madras Coins Society, Chennai

5 Pamphlet – Madras Christian College – Paintings Restored (English) 1-6-2000

6 Pamphlet – Care of Museum Objects (English) – 30-06-2000

Thiru .P. Jawahar, Curator, Zoology Section, Chennai

"Gorilla Man" – Museum's Journal (Tamil), May – 2000

Thiru. M. Mohan, Curator, Contemporary Art Gallery, Chennai

The Classical Art of Contemporary Indian Art'-Museum's journal (English), May 2000

Thiru. D. Jawahar Prasad Raj, Curator, Geology Section, Chennai

'Fossils' –Museum's Journal (English), May – 2000

Thirumathi. M. N. Pushpa, Curator, Botany Section, Chennai

"Plants Adaptation in Nature" – Museums Journal (English), May 2000

Thiru. R. Balasubramanian, Curator, Archaeology Section, Chennai

"A Rare Sadasiva Sculpture" – Museum's journal (English) – May 2000

Thiru . K. Sekar, Curator, Children's Museum, Chennai

"Children's Museum of Government Museum, Chennai" – Museum's Journal (English) , May 2000

Thiru .M. Gandhi, Curator, Government Museum, Vellore

1. Dandivarman's Alankuppam Inscription- Avanam, Vol. XI. August 2000.
2. Treasure-trove Bronze Icons from Nilamangalam, Kallakkurichi taluk- Avanam , Vol XI. August 2000.
3. A Tirtankara Sculpture Collected from Ponnagar, Vaniambadi taluk- Avanam , Vol XI. August 2000.
4. Vainayaki Stone Sculpture of Olugur Wallajapet – Avanam, Vol. XI. August 2000.

Dr. C. Maheswaran, Curator, Government Museum, Coimbatore

Kathari-Kadar Tribes' Hunting Trap (Tamil - Museum's journal (Tamil), May-2000.

Thiru . J. Mullai Arasu, Curator, Government Museum, Erode

Kanchikoilum Pazham Perumaium- Museum's journal (Tamil), May-2000

Thiru. C. Govindaraj, Curator, Government Museum, Udhagamandalam:

1 A Correction in the Tamil Inscription of Kudukiyanmalai"- "Avanam"(Tamil) vol.No.10, year.2000.
2 "Origin of Dravidian Order Pillar"-Souvenir, VII Annual Conference of Tamil Nadu History Congress
3 "Nandhikeswara with Monkey Face" – Museum's Journal (Tamil), May- 2000
4 "Pasupathamoorthy Sculptures found in Pudukkottai District – Museum's Journal (Tamil) May 2000.

Thiru .C. Srinivasan, Curator, Government Museum, Tirunelveli:

"South Indian Sloth Bear" – Museum's Journal (Tamil), May, 2000

Thirumathi. D. Thulasi Brinda, Curator, Government Museum, Krishnagiri:

1. "Whales" – Museum's Journal (Tamil), May- 2000
2. "Krishnagiri Museum" – 'Thinakaran' Daily (Tamil), October, 2000
3. "Hero Stones" – 'Thinamani' Daily (Tamil), October, 2000

Thiru .A. Periasamy, Curator, Government Museum, Palani:

1. "Inscriptions of Dindigul District" – Museum's Journal (Tamil) May, 2000
2. "Forts of Dindigul District" – Museum's Journal (Tamil), May, 2000
3. Pamphlet on Dindigul District Inscriptions – 10.08.2000

Thirumathi. J.M. Gandhimathi, Curator, Government Museum, Cuddalore:

"Traditional and Contemporary Miniature Paintings" – Museum's Journal (Tamil), May- 2000.

RESEARCH ACTIVITIES:

Conducting research is one of the major roles of museums. Curators of the museums are doing research not only in their concerned disciplines but also in the general categories related to their field of study. Some of the notable research projects on progress are listed below:

1. "Finger Printing of South Indian Bronze Icons" in collaboration with the Indira Gandhi Centre for Atomic Research, Kalpakkam (Chemical Conservation and Archaeology Sections).
2. "Holographying Bronze Icons" in collaboration with the Centre for Laser Technology, Anna University, Chennai (Chemical Conservation and Archaeology Sections)
3. "Monuments in Tamil Nadu" – A Project under the auspices of the Nehru Trust, New Delhi.-Dr.V. Jeyaraj.

4. Extensive Research is being continued on "Maritime History of the Minor Ports in the Pudukkottai District" and to locate the Medieval Port of Seliyur – Dr. J. Raja Mohamed, Curator, Government Museum, Pudukkottai.
5. "Documentation of the Tribal Art and Crafts" and "Decipherment of Bamboo Documents" – Dr. C. Maheswaran, Curator, Government Museum, Coimbatore

REPORTS:

Dr. V. Jeyaraj, Curator, Chemical Conservation and Research Laboratory.

1. Suggestions to Preserve the Volumes of Britannica Encyclopaedia, July 2000
2. Report on the Suggested Conservation Treatment of Two Paintings of the Singham Setty Ateendrooloo Chetty's Charities, Chennai.
3. Suggestions to Conserve Two Paintings of Srikanteswaran, August, 2000
4. Report on the Conservation of Paintings and Other Art Objects in the Lalit Kala Akademi, Chennai, September, 2000
5. Preliminary Report on the Proposed Conservation of Wall Paintings in the Athmanathasamy Temple, Thiruperumpudur, Pudukkottai District, September 2000

CONSERVATION WORK:

Both art and cultural objects belonging to the Department of Museums viz . 22 bronze icons, 22 iron weapons, 24 copper plate grants, 467 copper coins, 17 stone sculptures, 10 terracotta objects, 22 wood carvings, 10 leather puppets, 5 musical instruments, 10 anthropological tribal materials, 27 paintings, 30 palm-leaf manuscripts etc., were treated suitably and conserved by the Chemical Conservation and Research Laboratory.

Stuffed specimens of 12 birds, 3 pond turtles, a python, a kangaroo, a *hyenna*, a *sambar*, skeletons of dugong and *loris* were

suitably conserved and re-displayed in the gallery. 42 jars of wet preserved specimens from the display and 300 jars of wet preserved specimens from the reserve collection were refilled and suitably conserved by the Zoology Section.

CONSERVATION SERVICES:

13 oil paintings belonging to the Madras Christian College, Chennai-50, 4 metallic objects from Archaeological Survey of India were restored and conserved.

STAFF CHANGES:

1. Thiru C. Srinivasan, Assistant Curator, Zoology Section of Government Museum, Chennai was promoted and posted as Curator in Government Museum, Tirunelveli on 23.04.2000.

2. Thirumathi. S. Krishnammal, Curator, Government Museum, Tirunelveli was transferred to Government Museum, Ramanathapuram on 13.05.2000.

3. Thirumathi. S. Sugantha, Assistant Director of Museums (Admn.) retired from service on 30.04.2000

4. Thiru R. Balasundaram, Office Superintendent was upgraded as Assistant Director of (Admn.) Museums on 24.08.2000 and retired from service on 30.09.2000

5. Thiru G. Kalathi, Assistant Curator, Anthropology Section of Government Museum, Chennai was promoted as Curator and posted to Government Museum, Karur on 05.06.2000.

6. Tvl. A. Pugalendhi (Anthropology) and K. A. Murugavel (Botany) were appointed as Assistant Curators in the Government Museum, Chennai on 6.11.2000.

TOURS UNDERTAKEN:

Dr. R. Kannan, Ph. D., I.A.S., Commissioner of Museums:

14.04.2000-17.04.2000	Inspected the Government Museum, Madurai and had discussions with Collector, Madurai
21.04.2000-23.04.2000	Inspected the Cuddalore Museum and also the sites in around Cuddalore
26.04.2000-02.05.2000	Inspected Coimbatore and Erode Museums and also have discussions with the Collector, Coimbatore. Participated in the National Epigraphy Conference in Erode and the Museums Conference in Trissur .
09.06.2000-11.06.2000	Inspected Coimbatore and Udhagamandalam museums.
03.07.2000-04.07.2000	Inspected Government Museum, Salem
27.08.2000-30.08.2000	Attended the meeting in the Ministry of Culture, New Delhi
19.09.2000-22.09.2000	Attended the meeting and inspected the Saraswathi Mahal Library etc. Inspected the Government Museum, Nagapattinam and also participated in Tamil Nadu History Congress at Kodaikkanal.
29.09.2000-01.10.2000	Inspected Government Museum, Coimbatore, have discussion with the Collector, Coimbatore and also inaugurated an exhibition on "

Thiru K. Lakshminarayanan, Curator, Education Section:

27.08.2000-30.08.2000	Participated in the All India Museums Conference, held at Trissur and was elected as an Executive Committee Member of the Association.

Dr. V. Jeyaraj, Curator, Chemical Conservation and Research Laboratory:

12.07.2000	Annual checking of antiquities in the Government Museum, Kanchipuram.
27.08.2000-	1. Participated in the National Seminar of the

30.08.2000		Epigraphical Society of India.
	2.	Participated in the Seminar of the Museums Association of India at Trissur

Thirumathi. R. Santhi, Curator, Numismatic Section:

12.05.2000	Examined two treasure-trove finds of gold ingots and Indo British gold Pagoda coins at the Collector's Office, Chennai.

Thiru J. R. Asokan, Curator, Design and Display Section:

06.07.2000	Went to Villupuram to see the site for constructing building for the proposed District Museum at Villupuram.
07.07.2000	Went to Tirunelveli to study and suggest designing the display in the newly shifted building of Government Museum, Tirunelveli.
19.09.2000	Attended the meeting organised by the Culture Department, Government of India at New Delhi in connection with "Digitisation of Museum objects".

Thiru R. Balasubramanian, Curator, Archaeology Section:

19.04.2000-21.04.2000	Participated as a member of the Screening and Evaluation Committee of the Government of India to evaluate the bronzes, sculptures and other antiquities to send abroad for exhibition at New Delhi

Dr. J. Raja Mohamed, Curator, Government Museum, Pudukkottai:

27.08.2000-30.08.2000	Participated in the All India Museums Conference held at Trissur.
19.07.2000-21.07.2000	Annual checking of antiquities in the Government Museum, Tiruchirapalli

28.08.2000- 30.08.2000	Accompanied the Departmental photographers to photograph the monuments in Avudaiyarkovil, Thiruvarankulam, Thirukkottalam, Sittannavasal, Kudumiamalai, Kodumbalur, Viralimalai and Narthamalai

Thiru P. Kasilingam, Curator, Government Museum, Salem:

25.04.2000	Inspection of treasure-trove objects at Thiruchengodu
06.06.2000	Inspection of treasure-trove sculptures at Omalur
05.07.2000 to 10.07.2000	Checking of antiquities in the Government Museum, Erode and Krishnagiri

Thiru P. Sam Sathiaraj, Curator, Government Museum, Madurai:

17.05.2000	Inspection of treasure-trove hero stones at Vadipatti
10.07.2000	Annual checking of antiquities in Government Museum, Tirunelveli

Thiru P. Rajamohan, Curator, Government Museum, Tiruchirapalli:

17.08.2000-	Inspection of treasure-trove objects at Lalgudi
20.09.2000	Inspection of stone sculptures from the Nandavanam of Srinivasaperumal Temple, Nachiarkoil
28.09.2000	Inspection of treasure-trove objects at Thottiyam

Thiru C. Govindaraj, Curator, Government Museum, Udhagamandalam:

10.06.2000	Inspection of 'Rock Paintings' at "Idukatti" along with Commissioner of Museums which was discovered by the Curator

Dr. C. Maheswaran, Curator, Government Museum, Coimbatore:

12.04.2000	Field collection tours to the tribal inhabitation sites at Palamalai Hills
18.04.2000	Field collection tours to the tribal inhabitation sites at Kovilpalayam
24.04.2000	Field collection tours to the tribal inhabitation sites at Udhagamandalam
21.05.2000	Field collection tours to the tribal inhabitation sites at Kalkutti
03.06.2000	Field collection tours to the tribal inhabitation sites at Vellerikkombai
12.07.2000 - 13.07.2000	Checking of the antiquities in Government Museum, Uthagamandalam

Thiru N. Soundarapandian, Curator, Government Museum, Cuddalore:

17.07.2000- 18.07.2000	Checking of the antiquities in Government Museum, Madurai
28.07.2000	Inspection of loose sculptures at Sakthiamman Temple in Thiruvithancode.
27.09.2000	Treasure-trove stone sculptures of Vishnu and Amman were brought from Villavancode

Thiru A. Periasamy, Curator, Government Museum, Palani:

12.07.2000	Checking of antiquities in Government Museum, Kanniyakumari
05.10.2000	To receive a treasure-trove stone sculpture from Nilakkottai

Thiru G. Karunanidhi, Curator, Government Museum, Tiruvarur:

28.04.2000	Inspection of 'Burial Urn' treasure-trove at Kumbakonam Taluk Office

05.05.2000	Inspection of 'Burial Urn' treasure-trove at Aroor, Valangaiman Taluk
16.06.2000	Inspection of bronzes of Nataraja, Devi, lamp and a plate – treasure trove at Thiruthuraipoondi Taluk Office
05.07.2000	Inspected the Crawling Krishna (bronze) treasure-trove at Kudavasal Taluk Office
04.08.2000	Inspected the Saraswathi (bronze) treasure-trove at Needamangalam Taluk Office.

Thirumathi. J.M. Gandhimathi, Curator, Government Museum, Kanchipuram:

Stone sculptures at Madhuramangalam, 51 metal treasure trove objects at Thiruputkuzhi, bronze icons of Rama, Lakshmana and Hanuman at Valayaputhur village, 'devotee' stone sculpture at Madurantagam, treasure-trove coins at Thinnanur and 84 burial objects at Cheyyar were inspected.

Thirumathi. S. Krishnammal, Curator, Government Museum, Ramanathapuram:

03.08.2000	Inspection of a 'Amman' stone sculpture at Maraikayarpattinam
08.08.2000	Inspection of coins at Kanchiramgudi
17.05.2000	Inspection of bronze 'Durgai Amman' treasure-trove and 20 bronze idol treasure-trove found in Anandur village at Tiruvadanai Taluk Office
23.10.2000	Inspection of treasure-trove bronzes at Devipatnam Taluk Office

Thiru K. Saravanan, Curator, Government Museum, Nagapattinam:

27.04.2000	Eexamined the treasure-trove objects of 'Adalaiyur' at Nagapattinam Taluk Office

VISITORS:

During the period (April-September, 2000) the number of visitors who visited the museums were furnished below including school children.

Chennai	157310
Pudukkottai	25450
Salem	5759
Madurai	32567
Tiruchirappalli	12487
Vellore	16384
Erode	4660
Udhagamandalam	2367
Cuddalore	2182
Tirunelveli	5300
Kanyakumari	3309
Krishnagiri	4200
Palani	12096
Tiruvarur	11999
Nagapattinam	5586
Kanchipuram	3210
Ramanathapuram	7367
Karur	2600

SOME OF THE PRESS COVERAGE

Learned Men in New Light, The Hindu, Chennai-02.06.2000
The Madras Christian College project to restore 13 portraits of some of its doyen is a case in point. They were restored by the Government museum authorities and students including those of the college were astonished to find new life breathed into them.
Epigraphy can enrich modern society, The Hindu, Tuesday, August 8, 2000 – Salem.

Appreciation Letters

It is a matter of great satisfaction to us that we could bring Maestro Uto Ughi's special music to Chennai. As expected, the concert was very well received.

One of the successes of the concert was the Museum theatre, ideal in terms of acoustics and ambience. I take this opportunity to thank you and your staff for the support and co-operation we received.

R. J. Shahaney,
Console onorario d'Italia
Chennai
Codice Sede 3130508.

Thank you very much for your letter dated 20th instant. We have also received your recent publication "Museum Journal"-1999-2000. It is a good thing that studies on Museums and Museology are being regularly published by your department, which I am sure must be benefiting the professionals all around.

V.N. Dhaulakhandi,
Assistant Director,
Birla Museum,
Pilani.

On behalf of the College, I take this opportunity to thank you immensely for the wonderful manner in which you helped us to restore the portraits of the founders of the College. Needless to say, how efficiently it was carried out with the help of Dr. Jeyaraj. I am sure this restoration will enable us to remember with gratitude and reverence those who founded this great institution. A job, which was not accompanied for decades, has been made possible with the expertise of Madras Museum.

Alexander Mantramurti,
Principal,
Madras Christian College,
Chennai-500 050.

Prof. K. ALUDIAPILLAI, IAS (Retd.)
Formerly Secretary to Government of Tamilnadu
Former Vice Chancellor, Madurai Kamaraj University

AH 132,
Anna Nagar,
Chennai-600040.

4th January, 2001.

Sir,

Your publication – Monograph on Holistic Approach to Dating in Ancient History especially Indian History(May 2000) by Dr. R. Kannan, IAS is a highly readable researched work in an area needing objective quality research.

The final word has not yet been said in dating in Ancient History. To the existing four parameters used by Historians in dating Dr. Kannan has added three more. Use of all these facilities a holistic approach to dating, which can eventually gain greater acceptability.

The scope and limitations of Carbon-14 dating, Thermo-Luminescence dating, Lead-210 dating, Potassium-argon dating, Amino-acid dating, Dendro-chronology, Pollen analysis and Archaeological dating have been discussed briefly before going into the use of modern science like Laser Technology, Seismic Profiling, Magnetic Profiling and Photogrammetry in dating.

The statement that the conclusion of linguistic palaeontology in the absence of triangulation can only be evidence of links but not of origin needs to be pondered over. The sunken continent of Lemuria and the people who had inhabited it have been discussed logically and the anthropological findings are studied in the light of ancient historical tradition. The archaeological findings, astronomy and astrology with their minute calculations and historical records have been analysed and the evidence evaluated by the author to validate dating.

Renowned historians like Dr.Iravatham Mahadevan have established that Indus Civilisation is 'Proto – Dravidian' or' Proto – Tamil'. Researchers have opined that Sanskrit language adopted Tamil grammar known as Andrea grammar. Dr.Kannan feels that Lemuria

was the cradle of civilisation. Tamil and Sanskrit are inter-related. Sanskrit is possibly a refinement of Proto – Tamil.

Dr. Kannan is of the definite view that an integrated and holistic approach to dating alone will lead to reliable and unprejudiced findings in the absence of settled historical records.

In this monograph, the author has raised several issues for further research. He has repeatedly drawn attention to such a highly researched dating like the Indus Valley Civilisation, which is being re-evaluated and assessed in the light of more recent evidence.

The enormous pains that the author has taken in bringing out this monograph should be well worth it if this can be pursued vigorously with organising oceanic expedition and the holistic approach, which he has made a very strong case for, is kept in view by scholars in this area.

Yours faithfully,

(K. ALUDIAPILLAI)

Book Review, The Hindu, dated 5.12.2000

Holistic Approach to Dating in Ancient History Especially Indian History: Dr. R. Kannan, Rs. 35/-

Documentation on the Cannons in the Government Museum, Chennai: Dr. R. Kannan and R. Balasubramanian: Rs. 50/-.

In the first volume under review, the author who is the Commissioner of Museums, Government of Tamil Nadu has a broad survey of the important landmarks in the history of Indian civilisation and discusses their interaction, chronology and linguistic heritage. According to him, dating of ancient civilisations is a complex matter and it needs multi-disciplinary approach to arrive at the truth.

This holistic approach yields better results than conventional uni-disciplinary analysis due to feasibility of cross checking. With this

approach the author has many interesting, though somewhat unconventional, observations on many problems like the Aryan invasion, Sanskrit-Tamil relationship, racial migration, Lemuria, marine archaeology, carbon dating etc.

The second volume presents a well-documented catalogue of the old cannons in the Government Museum, Chennai, well illustrated by photographs. Nearly forty cannons one of the largest assemblage in any museum, were collected by the British... The authors have taken pains to provide all the historical informations regarding the cannons with excellent photographs.

As observed by Mr.S.Ramakrishnan, Secretary to Government, Tamil Culture and Religious Endowments, Government of Tamil Nadu, in his foreword, "This publication is on par with international standards and it enhances the prestige of the Museum"

Prof. K. V. Raman

Stop Press!

Commissioner of Museums, Dr. R. Kannan, Ph. D., IAS. has been selected as the correspondent for India by the International Association of Museum History, Paris, France.

150th year Celebrations

The Government Museum, Chennai is completing its 150th year by 2001. Arrangements are being made to celebrate the 150th year celebrations.

Museum Publication Fund Created

In a path-breaking move, the Government of Tamil Nadu has permitted the Commissioner of Museums to create a publication grant by accepting public donations for the publication of the museum as per the Government Order (Ms) No. 4, Tamil Development-culture, Hindu Religious and Endowments department dated 05.01.2001. This is in accordance with the latest Policy Approach to the 10th Five Year Plan of the Government of India

ARTICLES

ASTROLOGICAL ASTRONOMY AS PART OF THE HOLISTIC APPROACH TO DATING IN ANCIENT HISTORY ESPECIALLY INDIAN HISTORY

Dr.R. Kannan, B.Com., B.L., M.B.A., C.A.I.I.B., M..Soc. Sci.(Birmingham,U.K.), Ph.D., I.A.S.
Commissioner of Museums, Government of Tamilnadu, Egmore, Chennai-6000 08.

INTRODUCTION

Original ideas are the foundation of research. Many a time ideas that are not immediately accepted become the theory on the subject after a few years.

In dating history especially Ancient or Proto - History where there are no written records clearly giving dates we still remain in the realm of conjecture. The 'archaeologist' from the artefacts dug up as material evidence of human existence at a site or a series of sites makes out a story by informed guesses or conjectures. As the Fermat conjecture had to be proved in Mathematics, these conjectures have to be proved by more evidence from other branches of knowledge.

So far in dating, we have accepted only the dates and theories of history based mainly on the version of Archaeologists, especially in India. Each branch of knowledge like Archaeology (including Marine Archaeology), scientific techniques of Independent Dating, Comparative Philology and Linguistic Palaeontology (Linguistics), Anthropology-Physical Anthropology & Cultural Anthropology, Genetics, Ancient Historical Tradition (like Epics), Astrology, Astronomy and Historical Records (including Epigraphy) should be used to date events.

In this century, Modern Science has stepped in to aid dating. Its techniques for independent dating of events especially when correlation with other known events is not available has shed new light on old finds besides rejecting many of the old settled theories. Conclusions of historians are formulated or triangulated using Lasers for analysis of genes, Seismic Profiling, Magnetic Imaging and Sonar. Carbon–14,

Thermo - Luminescence, Potassium-Argon, Amino-Acid, Dendro - Chronology, Skeletal Biology, Pollen Analysis etc., are some of the dating methods used when dates have to be fixed independently. These methods have been examined and used in a more exhaustive monograph written by this writer and published by the Government Museum, Chennai (Kannan Dr. R., 2000). It dates events and validates established dates in accordance with the holistic approach advocated by this writer. After the monograph was written, an essay published as a booklet has come to notice. It is titled 'Integrated history of Ancient India' by L.S.Wakankar (1994). But it does not cover all the disciplines mentioned in the monograph. It contains some thoughts on the approach. The use of Astrology and Astronomy to triangulate dates or use them as a reliable input for dating is a unique feature of this work. This paper deals with the use of Astrological data validated by astronomical phenomena to date events in Proto-History and History.

ENDEMIC DISPUTES REGARDING DATES IN ANCIENT

HISTORY

Ancient Indian history suffers from the problem of lack of an agreed deciphered language and therefore settled dates. This problem exists with ancient Egypt, the Incas and other ancient civilisations, though the hieroglyphics have been deciphered. The dates given by Archaeologists varies as new finds keep coming up, pushing the findings regarding the period of the civilisation concerned further back.
Srinivasan contends that according to cryptographic theory, the Harappan script can be deciphered only if one can reduce it to some known language (Srinivasan K.R., 1988,p.1). There is no counterpart to the *Rosetta Stone* discovered by Bouchard in 1799 AD, which contained the same message in Greek, Egyptian Hieroglyphs and another language in the Indus Valley settlements discovered so far. There is a similar problem in Dating the Vedic era and so on.

Archaeology is the mainstay of dating events. It operates mainly through comparing artefacts for similarities with other finds in other areas where dates are already known or agreed upon. In recent years, it has started using independent scientific methods like Carbon-14 etc.

But it also gives out conflicting results especially when it is viewed through subjective bias. Bias can be in the selection of sample, contamination, interpretation of results etc. Standing alone conjectures like Aryan invasion, wrong dates like Indus Valley around 1500 BC or 1000 BC for the Vedas and Epics like Ramayana etc., will emerge. Therefore, it has to be corroborated with other disciplines to remove contradictions or wrong conclusions. This will enable deeper probing. Astronomy and Astrology, which are Indigenous Technical Knowledge in Participatory Rural Appraisal terminology have been neglected, because of our being enamoured with foreign to the exclusion of Indian knowledge. This paper highlights their importance in Dating.

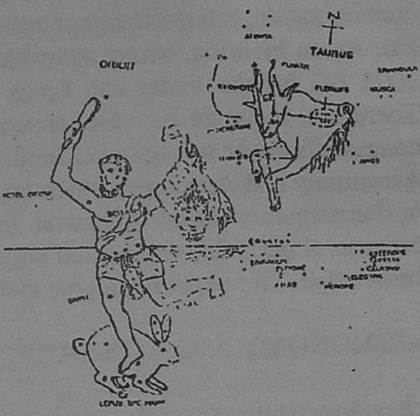
ASTRONOMY AND ASTROLOGY

They provide a very reliable method of dating. Astronomical dating has the further advantage of avoiding contamination unlike Carbon-14, Thermo-Luminescence dating et., since the heavenly bodies are as yet beyond the physical reach of man.

Our Vedic scriptures contain ever so many astronomical data with regard to events recorded in them. With the aid of these data and astronomical methods of calculations we can work out the dates and events to some extent, without much error. This method of ascertaining dates of events by astronomical principles is known by them as 'Aryan', since it belongs to the line of enlightened, cultured Rishi-teachers of ancient Bharat (Sakhyananda, 1998, p. 22-23). It does not refer to a race.

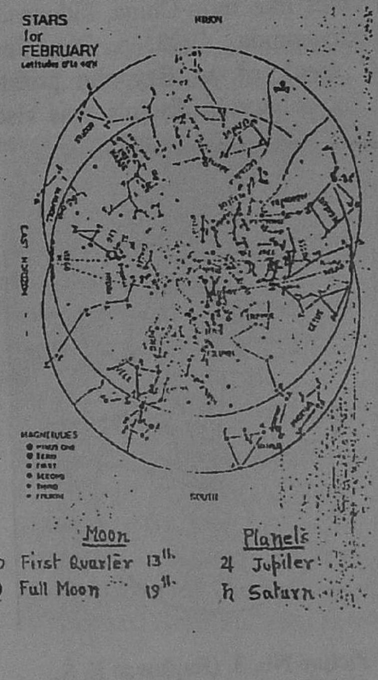
An astronomical approach to analysing ancient civilisations with the use of Precession and computer modelling of the Zodiac has been used by James Hancock who presented the programme 'The Lost Civilisation' on the Discovery Channel. He establishes that the Egyptian Pyramid of Gizah has an elaborate system of shafts, which point at Orion. He quotes Robert Bauval, a Belgian Engineer, the author of the 'Orion Mystery' and 'Forgotten Knowledge', who speculates that the Pyramids were not mere burial chambers of the Pharaohs but places to study Mathematical Astrology and Astronomy. The shaft at the Pyramid at Gizah pointed at Orion or Osiris, the main

God of Egypt. He analyses Angkor Wat in Asia and Chichen Itza, the Mayan pyramids to conclude that they all referred to 10,500 BC, after allowing for Precession. The rate of Precession was used to find out the year in which the monuments would have pointed at a star or sun on a particular day – for example, the summer solstice day. In Yonaguni Island, Japan there is an under seaport and a six storey building. Prof. Masuki Okimura of Tokyo University feels that it is man made and is nine to ten thousand years old. 9900 years ago it was on the ancient Tropic of Cancer. Similarly in Easter Island in the Pacific Ocean, there are statues which face the sun and point at certain stars. It is situated on the ancient Tropic of Cancer on its location 9900 years ago. It is interesting to note that the Easter Island script has been deciphered as the Indus Valley Script by Vilmos Hevesy, a Hungarian Engineer in 1934, who discovered 60 common symbols. This was rejected by the Epigraphist, whom Chambers calls the 'Normal Professional' in the language of Participatory Rural Appraisal (Chambers R., 1995, p.33; Rajagopalan R., 1995, p.62). Hancock refers to the Seven Sages as the teachers of the world, which is common to the Mexicans, Aztecs, Egyptians and other civilisations. All this points to a highly advanced maritime civilisation that navigated with the help of stars. Angkor Wat is 72° East from Gizah. He feels 54° represents Precession over a period. This rate is also used in Surya Siddhanta, an ancient Indian work on Astronomy. Our rate is around 50.3 seconds per annum. He does not realise that the Seven Sages are our Sapta Rishis. The geometric designs of the Incas in Southern Peru can be seen in



Picture No 1. Position of constellations in the sky (Hindu, April 2000)

their entirety only from the air. They are nothing but our Chakras. There is even an exact Sri Chakra shape. Therefore, there must have been an advanced civilisation, which could fly. Archaeologically, the sphinx is dated to around 2500 BC. But Robert Choch and John Anthony West of Boston University feel there is evidence of water falling down the Sphinx. At 2500 BC, Egypt was dry. Therefore, Astronomy should be used to supplement dating. They refer to a 300-year cycle of drought and flood to support heir theory. Hancock speculates that the Sphinx may be at least 5000 BC when there was rain in Egypt. Megaliths on the Chalk Hills in Southern Britain are aligned to Taurus as it was at 3000 BC (Precessed). In Stonehenge, the heel stone is aligned to the Sun. Carbon dating in 1997 AD has dated it 10,000 years ago, 5000 years earlier than normally thought. In Ireland, there is a megalith similarly aligned to the Sun on Solstice days. He thus concludes that all these civilisations date back to 10500 BC. In Pollen analysis done in Rajasthan in the now extinct Sarasvati River area, there is clear evidence of a cycle of rain and drought. Crops like wheat and corn have been grown.



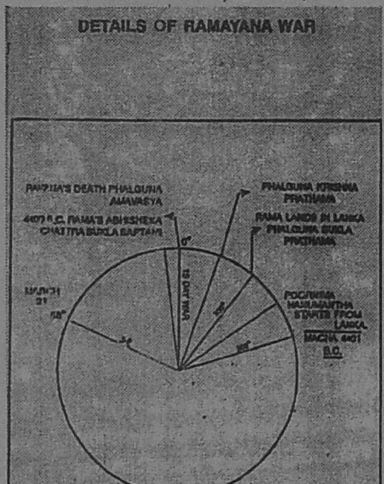
Picture No 2. Draco is 180° opposite Orion as seen from the pointing at Angkor Wat (Hindu)

The Rig-Veda has maritime references and therefore, there is a maritime civilisation before it {Rajaram N.S., 2000(1), p.121}. The Rig-Veda has a Verse 'let us by boat set out to all quarters of the earth'. They had ocean-going vessels with 100 oars and white sails. There are references to shipwrecks also (Pati Joshi Jagat, 1988, p.100). There are prayers to the Asvini Kumaras to save such an ocean going vessel caught in the midst of a storm. It may be pointed out that in 1.182.5 and other passages of the Rig Veda, the

Asvins are said to have made 'ships with wings' to save the son of Tugra from the water-floods (Sundar Raj M., 1997, p. 215).

The Saptha Rishi Era or Manvatharadi was started on Friday 21st November 8576 BC. (Raghavan K.S., 1998, p. 66). According to traditional chronological accounts of the Rajatarangini and Vedic Astronomical Calendar, Sraddhadeva Vaivaswata was crowed *Manu*, the first king of human society of this age (Manwantara-Mahayuga) by the Saptarishis in the year 8576 BC, Magha Sukla Prathama, when the Vernal Equinox was in the first quarter of the Magha Nakshatra, 120° on the Indian standard Ecliptic. The race of illustrious rulers descended from Manu is known by the name Manu-Kula Kshatriyas, or Arya Kshatriyas. Aryanisation means the process of educating and civilising the world of men by *Manava Dharma* – the law of righteous life enjoined by Manu. Otherwise how should we account for the imprints of Indian tradition and culture some of which are six to seven thousand years old, found even now in far off lands like Indo-China, Indonesia Mexico, Central America, Peru (Sakhyananda, 1998, p. 26). The Chaldeans as far back as 7000 BC speak of an Egyptian priest-astrologer named Manetho and that Satyacharya's disciple was also Manita.

Therefore, it is clear that the Seven sages that Hancock talks about are the Sapta Rishis described in the Hindu scriptures. He has not studied our ancient civilisation. His dating of 10500 BC may be due to his model of Precession. It has been precisely dated at 8576 BC, the date of crowning of Manu. However, since the Rishis must have been born long before Manu 10500 BC could also be taken as the time when they lived since there are Seven Rishis in a line. They have been described as the stars 'Sapta Rishis' in line with the



Picture No. 3. (Raghavan K. S., 1988)

theory that ancient religions based themselves heavily on natural phenomena especially Astronomy as seen in this section (Kannan Dr.R, 2000, p.34).

In the days of the Rig Veda the Vernal equinox was in Mrigashira or Orion, and that the Vedic texts, properly interpreted, clearly referred to a Nakshatras series older than the one beginning with the Krittikas at its head, thereby carrying back the antiquity of the Vedic civilisation to the fifth millennium BC". (From Vedic Chronology & Vedanga Jyotisha, B. G. Tilak, Poona 1925 p.10 from Pandya A.V., 1957, Hindi section, p.19). Since the 28th star Abhijit went away as pole-star in 10,000 BC only 27 of them are taken into consideration (Raghavan Prof. K.S., 1998, p.133). The Abhijit is depicted on the temple wall at Avudayar Koil in Pudukottai district, which this writer saw for himself. Therefore, to dismiss it as a myth is not wise.

Rejection of the Lemuria theory off hand has made us confuse present Sri Lanka with the real Lanka. There is a clear astronomical description of Lanka of Ramayana. Kanyakumari is on 3° Lat. The distance per degree is 69 ½ miles. As such the distance between Kanyakumari and the equator comes to 556 miles. Hence, Lanka should have been situated from 1° north of equator extending to the south of equator. (Sampath Iyengar G.S., 1998, p. 76). This has nothing to do with the present Sri Lanka. It is on 77° E longitude, which is still, called Lanka Rekha in the Snake Vakya Panchangam. The intersection gives the exact location, which is in mid Indian Ocean now. Rama's Sethu Bridge was in Tamil Nadu, on the West Coast and because it got submerged in 2700 BC, the Pandya Kings of the south built a new Bridge here. This proves that Ravana's Lanka was 7½° south of Kanyakumari on the Equator, crossing .the longitude 77° east, and ceased to exist long back. (Ramachandran V.G., 1998, p. 80). This sea ingression is corroborated by Marine Archaeologists Negi and Tiwari who use Dendro Chronology and the paper on 'Holocene Sea Levels' by Nair and Hashimi, seen above under Marine Archaeology.

In Carnace, France a very big megalithic burial site, there is evidence of a flood due to Ice Age 10,000 to 13,000 years ago according to Hancock. There were several Ice ages till about 13000 years ago. The

sea level was 120 feet below the present level. Antarctica was an evergreen forest, where the Mammoth roamed about. The recent raising of the Mammoth there proves this Anthropological theory (Discovery Channel, Profile Series - 12/11/2000). There were cycles of rise and fall in sea levels of Ice Ages and Warm Periods between 6000-4000 BC. Lemuria appears to be such a victim of human amnesia.

Historians naturally used to debunk claims of descent from Sun and Moon for Rama and Krishna that our epics make. These are to be understood allegorically and not literally. Lokamanya Tilak in his Orion states that there is Vedic evidence in support of the fact that the Vedic people had sufficient knowledge of Nakshatra astrology as far back as in 5000 BC. (Pathak K.K., 1998, p. 488). This period was named the Orion period as the Vernal Equinox was in the constellation of Punarvasu ruled by Aditi (Sun), this period (8000 - 5000 BC) was called Aditi or pre-Orion period by Tilak. Incidentally, the pivot of Treta Yuga, Lord Sri Rama, was himself born-in Punarvasu Nakshatras ruled by Aditi (the Sun). (Pathak K.K., p. 489). Hence, the Ikshvakus were called Surya Vanshis.

In Tilak's Orion period (5000 - 3000 BC), when the Vernal Equinox was in the constellation of Mrigasira or Orion ruled by the Vedic Devata, Soma (the Moon), it will be more proper to ascribe this period to Dwapara Age when Chandravanshi Lord Sri Krishna was born. Dwapara was an age of Chandravanshi rulers (Pathak K.K., 1998, p. 489). This was the era of Chandra Vanshi rulers. Therefore, there is a strong astronomical connection.
The Kings are not to be taken literally as descendants of the Sun and Moon. It is only an astronomical allegory to show the period of their rule.

The Ramayana can be accurately dated by analysing the horoscope of Lord Rama and relating it to astronomical phenomena. It is interesting to note that Dr. P.V.Vartak in his book Vastav Ramayan has attempted to calculate specific dates of important events in the Ramayana. Dr. Vartak came to the conclusion that Sri Rama's date of birth was 4th December 7323 BC. According to him, on the day of birth of Sri Rama, Saturn was at 25° Libra, Jupiter at 4° Cancer, Mars between 13° and

18° Capricorn, Rahu at 29 degrees Virgo and the Sun at 2 degrees Aries. Further, he indicates that as Venus is always within 47 degrees from the Sun, it was in an exalted position in Pisces (Dr. Bangalore Sureshwara, 2000, p.77).

We can see a reflection of these facts in the Mohen-jo-Daro seal No. M 420 that depicts a three-faced Yogi in the Urdhva Linga (penis erectus) posture. The horned head-dress symbolises Aum-the beginning of creation and according to Mundakopanishad Pranava (Aum) is Dhanu – perhaps Dhanur Rasi, the bow of Rudra as Pinakapani. (Chandra Hari K., 2000, p.125). Therefore, the theory of astronomical allegory gains more proof above. This point is also made by Bauval and Hancock who state that the Egyptian God Osiris is related to the stars. This has been the pattern with ancient civilisations.

For accuracy of dating, it is essential to fix the rate of Precession and the initial point of the Fixed Zodiac. Nirayana or Siderial as opposed to Sayana or Tropical astronomy measures from the initial fixed point. The movement of the Equinoxes is deducted from the movement of the planets since the measurement is with respect to a fixed star. A star is relatively fixed as compared to the movement of the Equinoxes. This initial point fixes the Kali Era.

The length of the Aryabhattian year is very nearly 365.258681 days while the correct length of the sidereal year is 365.256363 days, that is, Aryabhattian year is longer than the correct length by about 0.002318 day, that is, by 3 mts. 20 sec. Therefore, 3600 Aryabhatian years will be longer by about 8.345 day.(Chatterjee Com. SK (Red.), 1995, page.502). This degree of accuracy is uncanny considering the period at which they were calculated and instruments, which were used. There is similar accuracy in South American cultures like Incas, Mayans etc.

It is possible to date the Mahabharata from the wealth of astronomical and astrological data given in it. B.V. Raman has calculated the exact date of birth of Lord Krishna as 19th July, 3228 BC (Raman B.V., 1981, p.1).

Aryabhatta took the step to standardise the epoch of this ancient Era by mentioning it was 3600 years of his life. He saw the great advantage of standardising this Era. 3102 BC as the origin of Kaliyuga and the standardised calendar of the Calendar Reform Committee is generally adopted throughout India (Chatterjee Com. S. K. (Retd.), 1997, p. 618).

Sri Sankara Rao Borgaonkar in his article on the Birth date of Adi Sankaracharya in the Astrological Magazine of 1972 December, edited by Dr.B.V.Raman, Bangalore, states: " Thus Lord Buddha must be placed about 1200 to 1300 years before Adi Sankara. Adi Sankara was born in the year 509 BC" (Ramachandran V.G., 1998, p. 206). Historians usually date Adi Sankara to circa 8th--9th century AD. This shows the important contribution that Astrology can make to Dating. Of course, it must be triangulated with data from other disciplines. But to reject it off hand is not being wise.

CONCLUSION

Astronomical Astrology throws valuable light on the dates in Ancient History, where no written data is available. The holistic approach this discipline also to solve the riddle of dates. This gives valuable new insights which conventional wisdom ignores. This has made us to see Ancient History especially Indian History in a totally new light.

Migration is not only by land but also by sea. It occurs not at one point of time or in one direction but at several time periods and directions. Migration is not only through land upwards through Egypt and North Africa but by land through the then existing land mass of Lemuria and by sea to Asia, America, Oceania (Australia) and Europe. This is ignored in the Received Wisdom, which is slowly beginning to change under the onslaught of modern research and disciplines such as Anthropology, Astronomy cum Astrology, newer scientific methods and new finds in Archaeology etc.

The dates of the Rig Veda have been pushed back at least to circa 8000 BC. Events like the birth of Lord Krishna, Kaliyuga etc., have been validated. The horse is found to be an animal used in Ancient India and not a recent import circa 1000 BC as was thought earlier.

A maritime civilisation that spread through out the world is established. Even the date of the Sphinx and Stonehenge is called into question. The Sapta Rishis were the teachers of the whole world. This civilisation had spread even into South America. This is during the age of the Rig Veda circa 10000 BC. Indian culture is reflected in Mayan, Incan and other Latin American cultures.

Astronomy and Astrology together with Marine Archaeology has validated that Rama and Krishna were historical personalities. The Mahabharata and Ramayana are not a figment of imagination but recorded history.

Many episodes and stories in our Puranas are allegorical representations of astronomical phenomena like Surya Vamsa etc. These help in precise dating. The Black Hole Theory of matter and anti-matter was known to our seers. They are described as Astronomical allegories in our Puranas.

India knew about Precession and Astronomy so much that even today with the latest technology and computer simulation our Precession values hold good. Even in recorded history the date of birth of Adi Sankara is pushed back to circa 6th century BC from 8th century AD. This is based on Astrological cum Astronomical analysis. Similar precision is found in the calculation of the duration of the year by Aryabhatta.

There is clear Triangulation among the different disciplines, which probe into History. If aggregated by integration, they give the same '*big*' picture. Therefore, a holistic approach to Dating is the only reliable and prejudice and hunch proof method of Dating in Ancient History in the absence of settled historical records.

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FIELD STUDIES - FINDING OF BUDDHIST SCULPTURES AT PETTAVAITHALAI PETTAI, THIRUCHIRAPPALLI DT

On the information provided by Thiru P. Rajamohan, Curator, Government Museum, Trichirappalli,, the Commissioner of Museums, Dr. R. Kannan, Thiru K. Lakshminarayanan, Curator (Education), Chennai Museum and the Curator, Trichirappalli Museum visited the village Devasthanam 2 km. South to the Karur-Trichy Main Road, near Pettaivaithalaipettai of Trichirappalli District on 13.11.99.

In the field study, the team identified a broken late Pallava period lion pillar, two broken Dvarapalaka sculptures, a beautiful Buddha statue in seated *Dhyana* posture.and architectural parts of medieval Chola period temple, in the vicinity of the Siva temple Madhyanesvarar Temple. Even in their severely damaged condition, the broken parts of the Dvarapalaka sculptures exhibit the good workmanship of the Muttaraiyar strand of the Chola Art School (circa 10th Century AD). The seated Buddha sculpture (Ht. About 107 cm.) found by this team under a coconut tree in a nearby place is an exquisite Chola sculpture of circa 10th Century AD. This sculpture is a strong evidence for the great influence the Buddhism had in the village, which is called Devasthanam before the construction of the present Siva temple there during the Chola period after 11th Century AD.

The finding of these ancient archaeological artefacts had been reported to the Government through this office letter No.677/2000/B5 dated 7.3.2000) with the request to instruct the State Department of Archaeology to study the site and take necessary action on the basis of the study.

The Collector of Trichirappalli District has been requested to hand over the sculptures to the Government Museum, Trichirappalli for preservation. This important find is brought to the notice of scholars to take up further studies.

TAPASVINI PARVATI & STHANU LINGA

R. Balasubramanian,
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Worship of the Mother Goddess in various forms is undoubtedly Pan Indian and one of the most important and fascinating aspects in the annuals of the history of Indian religions. Feminine divinities were indeed worshipped in some form practically all over the world and scholars far and wide have considered this to be among the earliest forms of man's religions. But nowhere do we find such building variety and so long and complex a history as in India. There is of course, also plenty of literature on the subject of Indian Goddesses.

Images of Parvati present three aspects, viz. Parvati in penance, (Tapasvini Parvati), Consort of Siva (*Siva-gehini*) and Mother (*Mata*) with Kartikeya. It is interesting to note that in the field of iconography the forms of Parvati, if compared with those of other female divinities are many and more than others. They if put together, not only portray the life sketch of this goddess, but also suggest the aspects of creation, maintenance and destruction. Tapasvini Parvati or Gowri, the daughter of Himavan practicing penance is the subject matter of our study here. This is of two types pre-marriage and post marriage penance.

According to the literatures and puranas Parvati in her previous birth was the daughter of Prajapah Daksha and was known as Dakshayani, Sati and even as Lalita Daksha was not in good terms with his son-in-law, Siva. Once on the occasion of great sacrifice, Daksha had not extended due courtesy to Siva, but Sati went to participate in the function in difference of Siva's wish. She was ill-treated much, she threw herself in the sacrificial fire and died.

As the story goes further, Sati chose the house of Himavan for her next birth. Kalika Purana 2 (Kalika, adhyaya 41, p.279) narrates us that once Siva and Sati were residing in the Himalayan region. During their stay, Dakshayani was carefully looked after as Hitaisini by Himavan's

wife, Mena. Because of this warm reception, Sati chose the house of Himavan for her next birth. Narada, in her very childhood had preferred that Siva would be her husband. As time rolled by, Parvati started practicing penance to win Siva as her husband. Her other name Uma is closely associated with her penance. Again Kalika purana (adhyaya 24) makes it clear that when Menaka heard about the determination of Parvati to do penance, she tried to dissuade her saying..Uma meaning " O girl ! don't do it. Later Siva came as a brahmachari and tried to disturb her by uttering Siva's unauspiciousness and terrific features; but everything went fusile.He took his real form and agreed to accept her as his betterhalf. This is to show the pre-marriage penance of Parvati.

Parvati by birth was of dark complexion. Once after marriage, when she embraced Siva, the latter jocularly observed that her embracing him looked as if a dark she-scripant *(bhujangini)* was embracing a white Sandal tree. (Matsya Purana, 154.1.p.455). Irked by this remark she wanted to do penance and vowed to return back only if she could get her complexion changed. She went to the mountain and accepted the ascetic garbs and got herself in a very hard tapas. Eating only some forest products (Vanyahara) or even without that, she would get herself surrounded by fires on five sides (panchagni sadhana) in summer. This anacdote is very important here as we are going to discuss the details of a sculpture depicting this scene. This sculpture was received from Mukhalingam village of Srikakulam District, Andhrapradesh.

Parvati is depicted as standing amidst five fires doing penance in a pillar, which has two compartments.Here Parvathi is shown as standing amidst four fires with four hands holding a Kamandalu in her lower right hand and lola in her lower right . She carries flowers in her upper hand.

In the lower compartment Ganesa is depicted as seated with his vahana, mouse. On the other side, two compartments are there. In the upper compartment Siva is shown as a sthanu (Lingodhbhava) depicting the Hmyphallic linga for by synecdoche, stands urdhvaetas, i.e.the drown up seed -a pillar (Sthanu) and symbol of

chastity"(Agrawala.V.G.Siva Mahadeva-The Great god. An exposition of the symbolism of Siva, Varanasi, 1966 p.40.) While Brahma with three heads standing and viewing the Sthanu from the right and Vishnu viewing him from left. There are two figures underneath Brahma and Vishnu, which are not clear due to weathering of the stone. In the other lower compartment Parvati is shown as standing with emblem, which are not clear due to weathering. This sculpture is very much important one as there is no other specimen available for study.

SCULPTURES OF SELF IMMOLATING HERO

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A rare sculpture of self-immolating hero, cutting his own head, is discovered in Sri Ponvasinathar temple at Illuppur in Pudukkottai District, by the author. Such a sculpture is discovered for the first time in Pudukkottai District.

The sculpture of three feet tall is in standing posture, depicting a hero cutting his own head. The left hand of the hero holds the tuft of hair and a sword in the right hand pierces through the neck, thus cutting the head for sacrifice. An inscription on the left side of the sculpture reveals that the name of the hero as Alagan of Keelakkurichi (a village near Annavasal) and tells that this sculpture was erected by the Araiyars of Konadu (Chieftains of Konadu in which Illuppur was situated) in memory of this hero. The sculpture may be dated to 16th century A.D.

Self-sacrificing ones own head to the goddess Kali, in pursuit of certain vows, was a practice from the Sangam Age. Silappadikaram the Sangam Tamil classic of 2nd century A.D. refers to such practice of self-immolation in Puhar. According to Sillapadikaram, the heros, in pursuit of victory in war, vowed to sacrifice their head to the guardian deity of the city. But, such sacrifices were done before the goddess "Kali", who was considered as goddess of victory. The heros, who wanted to sacrifice their head did so in a ceremony with pomp and show. "*Kalingathuparani*" of 11th century AD also mentions such practice. Sculptures depicting such sacrifice are found in the early Pallava cave temples at Mamallapuram, Singavaram and Tiruchirapalli and also in some temples of later period in places like Mayiladuthurai and Pullamangalam.

But this practice was in vogue till recent centuries and was much more in 15-16th centuries A.D., but sculptures depicting this theme, are found rarely. Sculptures with inscription are still rare.

The sculpture, which is kept outside the temple now, actually did not belong to Sri Ponvasinathara (Siva) temple (12th Century A.D.) because no such sacrifice is made to Siva. Field studies by the author revealed that the sculpture once belonged to the ancient Kali temple, very near to the Siva temple, and was brought to this temple some years back and kept along with the debris in front of the temple. Now, the discovery has revealed the real significance of the sculpture. The sculpture has attracted the attention of scholars, since it is the first find of this kind in the district.

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ARDHANARISVARA

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The name, '*Ardhanarisvara*' is a combination of three words – *Ardha, nari* and *isvara,* meaning Isvara- Siva with Nari - Parvati, as his *Ardha,* the half a form, where the same body is shared by Siva and Parvati each of them represent one half of the composite image.

Ardhanarisvara form of Siva in symbolic form was most prominent in the Indus Civilisation of the third millennium B.C. Earliest evidences of such kind have come from various Harappan sites revealed syncretism. A large number of *Linga yoni*

figures discovered at these sites are the examples of syncretistic divinities. These objects are believed to be the combined form of Siva and Sakti. [1] These primitive emblems i.e. the *linga* and the *yoni* are still the most common objects of worship of Hindu religion whether in the temple or in the household cult and occur most commonly in association specifically with Siva and his goddess, Parvati.[1]

The image of Ardhanarisvara is normally divided into two parts, the left part usually shows the female characters related to the iconography of Parvati and the right part shows the male characters related to the iconography of Siva.

Earliest Depiction in Human Form:
The earliest representation of Ardhanarisvara is depicted on gold coins of later Kushana period.[3]

The earliest depiction on seal is noticed during early Gupta period (4th century A.D). The seal was discovered at Basarch excavation in Bihar.Earliest depiction in terracotta is also found during Gupta period$_4$. One terracotta head

. preserved in the National Museum, New Delhi, which was obtained from Neval, U.P[5].

Stone and Bronze Images of Ardhanarisvara

The earliest stone sculpture of Kushana period is in the Mathura Museum. The deity is two armed and shown standing with other brahmanical deities.i.e.Vishnu, Gajalakshmi and Karthikeya, *Urdhavalinga* and *yoni* are also carved. (Joshi 1979:147).

One three armed bronze image of the Chola period is preserved in Government Museum, Chennai. This image was obtained from Tirvengadu, Thanjavur District. In this bronze image, the right half represents Siva and the left half Parvati. Siva has a *Jatambakuta* with a crescent moon. He has three arms the lower right rests on the back of the bull which not shown and in the upper right he holds an axe. On the left side (female side) the image has a *Karanadamakuta*.

A four-armed image of Chalukyan period is depicted in a rock cut temple at Badami. Unique feature of the image is that it is shown playing *veena* with one left and one right hand[7]. An eight-armed dancing *Ardhanarisvara* is depicted at Parasuramesvara temple at Bhubanesvar. The upper two female hands hold a mirror and a book and the upper male hands have a *lute* and an *akshamala*. The other hands are broken. On the pedestal two skeleton shaped *Pretas* or spirits are shown[8].

One headed image with four arms is seen in the Gwalior Museum. A special feature of this sculpture is a big well-decorated *prabhavali* shown behind the hand, which is proportionately large in size [9]

One unique stone sculpture of Ardhanarisvara is seen in Darasuram, Thanjavur District, Tamilnadu. The image has three faces and eight arms. The head is surrounded by *prabhamandala*. The hands carry in them the *akshamala*, the *khadga*, the *pasa*, the *musala*, a *kapala*, a lotus flower and other objects[10].

A three-armed image playing veena in sitting posture is depicted at Kailasanathaswami temple at Kanchipuram of seventh century A.D. The deity is sitting on a bull and the bull is also in a sitting posture.

Thus, from the above mentioned few images of *Ardhanarisvara*, it is clear that the *Ardhanarisvara* form of Siva in general is shown with one head, which is shared by Siva and Parvati. The right part of the head is that of Siva and the left is that of Parvati. The right half should have *jatamakuta* with crescent moon. The ear should be adorned with *makar kundala* or *sarpa kundala.* On the forehead half eye should be depicted. The left half of head should have *karanda mukuta* or fine knot of hair well combed. On the forehead contiguous with half eye of Siva should be shown. The eye should be painted with collyrium. In the ear there should be a *kundala.*

Thus it is concluded that the sculptures of Ardhanarisvara are found in all parts of India and some variations are found in north and south Indian sculptures. One most important character of north Indian sculptures is that the Siva is shown with Urdhavalinga, which is absent in South India. This tradition can also be seen in East Indian sculptures.

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THANJAVUR PAINTING COLLECTION IN THE GOVERNMENT MUSEUM, CHENNAI

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The name Thanjavur painting refers to certain style of painting, which attained a characteristic form in the Thanjavur area during the Maratha period. Maratha kings ruled Thanjavur for about 180 years. During their tenure, the impact of Maratha culture and their religious concepts were depicted through Thanjavur painting.

During the foreign invasion traditional art slowly lost their vigour. The painters of Mughal court had to seek asylum in the Deccan for their livelihood. Some of the artists later on migrated to Andhra, while some were appointed at the court of Thanjavur. The Thanjavur School became almost completely illustrative with Rajas and Ranis dressed up as if giving pose for photographs with their eyes towards the audience. In both the Andhra and Tamil Schools, the oriental love of elaboration in costume and environment remained.

The Art Section of the Government Museum, Chennai has a good collection of one hundred and sixty Thanjavur paintings. The medium is tempera on paper and on wood. The variety of Thanjavur painting collection is as follows:
1.Miniature type 2. Large size 3. Painting on Glass 4. Painting on Mica 5. Painting on Ivory, 6.Miniature wooden shrines 7.Leather paintings.

Miniature Paintings

The support material used for the miniature painting is paper. The medium is mainly tempera. The paintings depict the epic scenes of *Periapuranam*, which tells about the vital role played by Lord Shiva. Some of our collection is: 1.Siva presents to Pandyan king an inexhaustible purse, 2. Siva as Siddha making a stone elephant to eat.

Large Size

The support material used for this type of painting is wood. The composition mostly is the portraiture of Raja and Rani in seated posture. The costumes and the ornaments are mostly northern Indian type.

The painting has strong sky blue or red as background. The curtains and other decorations shows the impact of foreign influence mostly the British.

They mostly portrayed deities (mostly centrally placed deities), saints, portraits of both courtly and secular themes. The paintings were generally executed on ivory, glass manuscripts etc., The most noted Thanjavur paintings are in the gilded and gem set technique and are sacred icons of Hindu deities. The paintings are large in size and are wooden framed.

The colour pattern of these paintings is usually strong. There may be deep green, strong blue or red background, while the principal figure are usually in white or yellow, green or blue. Red and blue or red and green arrangements often dominate the composition. The vital role is played by gold, which tends to bind and hold the picture in its decorative structure. Some of the best large size paintings on display are 1. Sivaji and his Queen Saitamba Bai 2. Krishna

Painting on Glass

The technique of glass painting was adapted in the Indian painting in the second half of the 18th century A.D. The theme of the glass painting is courtly; consisting of portraits of nobles and ladies. The technique of painting on glass was borrowed through the Chinese artists, whom they visited the court of Indian kings.

The glass painting has rich colour, pink or blue with strong modelling in the face. The background is more or less flat.

The painting method is reversed; details particulars ending lines are done first and the large areas of colour later. The picture is then mounted with its unpainted side foremost so that it is seen through the glass. Raja-Rani, is one of the best Thanjavur paintings in our collection.

The glass painting shows crowded and close figures. The picture is on one plane. It is generally tempera with brush outline and details, which will when finished, appear uppermost. Later the larger areas of opaque colour are brushed in. These are generally flat except the drapery. The face and body of the images with fullness is finished by shading. The shading is a kind of modelling, which tries to show the roundness of forms.1. Woman Playing Veena 2. Lady Playing Thambura is some of the best Thanjavur paintings in our collection.

Painting on Ivory

The idea and technique of painting on ivory came to Thanjavur from North India. The ivory painting was practised in Thanjavur from about 1790 AD. The technique of painting on ivory is similar to that of watercolour painting. The ivory is seasoned or pressed to keep it from warping and then polished to get smoothness. Here are some examples of painting on ivory 1. The King 2. Taj Mahal

Painting on Mica

The technique of painting on mica was borrowed from Patna and Banaras, where it flourished in the 18th and 19th centuries A.D. The Mica paintings are small in size due to the fact that only small sheets of mica were available. Painted wooden shrines with small figures of deities are in the Museum collection. A mica painting with the subject of Vamana *Avatar* is worth seeing.

Playing Cards

Playing cards are smaller in size and made up of ivory. The background is rich with blood red colour with figures in white, green ochre and the borders are in green colour. A number of animal motifs,

including monkey, horse, fish, bull and mythological beasts are seen. Figurative cards include Vishnu and his avatars, a notable man on horses` back, a warrior and a saint are seen in the collection. .

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A VENETIAN COIN FROM COIMBATORE DISTRICT

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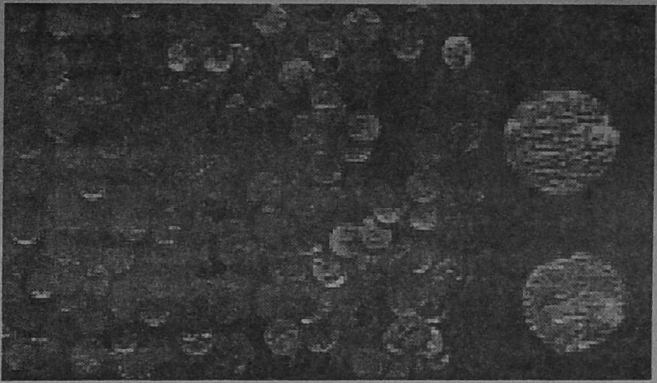
In the year 1995, Government Museum, Chennai received a hoard of 254 inferior variety of South Indian Panam, one Sultan Gold Coin and one Venetian coin from the village Kanjampatti of Coimbatore District. All these South Indian *Panams* are circular in shape, containing twelve dots and bearing no legends.

The important issue of this hoard is the Venetian coin. This coin is in circular shape with a diameter of 3 c.m. weighing nearly 3.95 grams. In the obverse, the standing figure of Saviour handing over the flagstaff to the new Duke is seen. The legend



below the flag staff read DUX (Duke)

On the flan side the legends read TOM MOCENIGO which indicates the Duke 'Tomes'

The reverse side of the coin depicts the standing figure of the Saviour, holding a book type with rosary. On the either side of the figure the stars are represented. The legends of the flan could not be deciphered satisfactorily. But on the whole. this is an important Venetian coin, which requires further study with other Venetian coins of the same period.

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Venetian Gold Coin Obverse

Venetian Gold Coin Reverse

A NOTE ON PILLAIPERUMAL NALLUR TREASURE TROVE FINDS

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A large number of treasure-trove finds are reported in Nagapattinam district recently. Thiruinthalur, Konerirajapuram, Muvalur in Mailaduthurai Taluk. Thinenagiri, Alakkudi, Koothiyampettai in Sirkazhi taluk, Kathiripulam, Sembodai, Maruthur in Vedarangam taluk, Vazhkudi and Nagoor in Nagapattinam Taluk. Anakkudi and Mela Easalur in Thirukkuvalai taluk, Pirathabaramapuram in Kilvelur taluk; Kodaivilagam and Pillaiperumal Nallur in Tarangambadi taluk have revealed a large number of antiquities. Among these the Pillaiperumal Nallur treasure- trove finds are remarkable one.

Treasure-trove findings Pillaiperumal Nallur in Tarangambadi taluk

Pillaiperumal Nallur is situated 4 km east of the famous Thirukadaiyur in Tarangambadi taluk. The Collector of Nagapattinam District granted permission to P.P.Generating for quarrying Company, in the survey No.118/1 (Dryland). When quarrying work was on, a stone sculpture Slaving (without base) was discovered on 12.3.99. Subsequently, the following treasure-trove objects were recovered in 13-3-99 by Thiru N.Balasubramanian, Thasildar of Tarangambadi taluk and were recorded under Treasure-trove act of India.

S.No.	Name of the Object	Dia	Height	Weight (in gms)	Metal
1.	Bowl	53 cm	13cm	750	Copper
2.	Broken tripod	40 cm	20 cm	900	Copper
3.	Broken tripod	33 cm	20 cm	500	Copper
4.	Broken Dipakkal	17 cm	14 cm	550	Copper
5.	Dupakkal	16 cm	11 cm	550	Copper
6.	Handle of a chamber	22 cm	24 cm	125	Copper

7.	Stand	26 cm	10 cm	300	Copper
8.	Broken Stand	14 cm	18 cm	275	Copper
9.	Broken Stand	4 cm	12 cm	60	Copper
10.	Broken Stand	4 cm	19 cm	40	Copper
11.	Bell	38 cm	27cm	1050 grams	Copper
12.	Part of Bell.	7 cm	11 cm	75 grams	Iron.
13.	Broken stand.	4 cm	6 cm	40 grams	Copper .
14.	Broken Rod	3 cm	9cm	40 grams	Copper .
	Total weight			**5255 grams.**	

The Commissioner of Museums, Dr. R. Kannan., I.A.S., made an on the spot inspection of these objects in Pillaiperumal koil on 31.12.1999. According to him as there are ample chances of more treasure-trove objects underneath.

Ancient Temple in Pillaiperumal Nallur:
In Pillaiperumal Nallur, stone sculpture and objects used worshipping have been discovered as finds. There fore there is a possibility of a submerged ambient temple in the vicinity. If excavation is made here in this locality many more objects may be recovered.

Present Status of Pillaiperumal Nallur Treasure- trove Find.

The Pillaiperumal Nallur treasure-trove objects are now under the custody of the Tarangambadi taluk office. Steps have been taken to bring and display the treasure-trove objects in the Nagapattinam District Museum..

THE INDIGENOUS KNOWLEDGE SYSTEM OF THE PANIYA TRIBES IN HUNTING - GATHERING ACTIVITIES

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Introduction:

The Paniya Tribes are believed to be the "Aboriginal forest dwellers" inhabiting a lower western slopes of the Nilgiris (ie. In the Pandalur and Gudalur taluks) up to an altitude of 1200 meters before being taken into bonded labourer by the local landlords. At present they live along with Bettu Kurumba, Senu Kurumba and Mullu Kurumba tribal groups. The Settlements of Paniya Tribes consist of only a few houses with the exception of a few cases where the number of houses may be 20 or more. Currently, Paniya Tribes are in transition from a "forest culture and slave economy to a 'cash economy'. And consequently, now the sources of income are primarily on daily wages through fire wood collection and seasonal casual labour.

How ever, the recent field studies have revealed that Paniya Tribes possess an exclusive stock of indigenous knowledge system on multifarious food-gathering techniques. And hence, they rightly claim a place among other Food-gathering Tribes of Tamilnadu in general and of the Nilgiris, in particular.

And in this present paper an attempt is made to portray their exclusive stock of indigenous knowledge system on multifarious hunting-gathering activities.

The Hunting-Gathering Activities of the Paniya Tribes-A Detailed Account:

The Paniya Tribes indulge in various kinds of hunting-gathering activities such as 'hunting of wild boar', 'catching of wild birds', 'fishing', honey-collection. During these hunting-gathering activities they employ different indigenous methods from their stock of

Honey-collection is carried out by the Paniya Tribes in three different methods, namely, by approaching the honey combs located in relatively of moderate heights, or by placing the indigenously crafted bamboo ladders over the trees (or the rocks, as the case may be), or by reaching the honey combs that are located in the inaccessible places and or heights by swinging from one tree (or rock, as the case may be) to another by employing an indigenous creeper (known as *cural kodi* in their language) of high strength and flexibility or by piercing the honey combs by shooting with an arrow tied with a long wild coir wherein its one end gets entangled in the honey comb while through its other end the honey gets collected in a vessel kept beneath.

It is worth mentioning here that in all these operations the portion of the honey combs containing honey alone gets disturbed and consequently that damaged portion (of the honey comb) is later allowed to get repaired and restored by the bees, in the coming up periods.

Conclusion

From the afore mentioned details, it is evident that the Paniya Tribes certainly possess an exclusive stock of indigenous knowledge system on the hunting-gathering activities. And accordingly, the Paniya Tribes could rightly claim a place among other "food-gathering tribes".

Colophon:

The author of this paper wishes to record his deep sense of gratitude to Thiru. R. Ranganathen, founder-Director of Centre for Tribal and Rural Development (CTRD), Ealamanna, Pandalur (Taluk). The Nilgiris and Thiru. V. Kitten, Paniya social worker of Murukkambadi, Kolappalli (via), Pandalur (Taluk), The Nilgiris for all the helps rendered in carrying out the field study successfully on 28-09-96 at Murukkambadi Paniya tribal hamlet.

ORCHIDS

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As a group, orchid family is one of the largest families of flowering plants in the world with up to 30,000 or more species belonging to nearly 800 genera. They grow all over the world but the majority of species occur in the warm humid tropics and their number dwindles towards the poles.

Orchids exhibit an astonishing variety of size and form. A complete plant of certain species may be no larger than a man's thumb nail but some others may have flowers with petals 60 c.m. (2 feet) long. But all orchids are monocotyledonous and perennial herbs. They may be terrestrial or epiphytic, saprophytic or autotropic but are never parasitic.

Flowers may be solitary or may be panicked or racemose frequently in spikes. They are always zygomorphic and have three sepals two petals a lip and a column formed by the fusion of the stamens and style. Their complex structure is related to their pollination mechanism.

The largest number of orchids is epiphytes growing on trees in tropical rain forests. They are most abundant in the extremely humid cloud forests of mountain slopes, which create ideal conditions for epiphytes.

Temperate species and a few tropical ones are terrestrial herbs that inhabit grasslands, woodlands, mosses and bags or rocky mountain ledges. They grow out of the ground like other forms of land plants.

A few woodland species of temperate zones such as the coral root orchids CORALLARHIZA are saprophytes. They have no green pigment and cannot produce their own food. As a consequence these plants are dependent on the decaying humus.

STORIES OF SPICES

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Spices are the vegetable products that are strongly flavoured, usually rich in essential oil, derived from the roots, barks, seeds, fruits or buds. The search for spices played a prominent role in the great Portuguese, Dutch and English voyages that in the thirteenth century AD and eventually led to European's discovery of the Western Hemisphere. Most important spices came from the tropics of Asia.

Spices play a dominant role not only in culinary art, but also in confectionery, in the preparation of beverages, liquors, cosmetics, and in perfumes. The tamed explorers of the past who were searching for gold paid almost equal attention to spices. It was the pursuit of these as much as anything that led men to the first rounding of the 'Cape of Good Hope' and the colonisation of East Indies.

The fame of the Indian spices is older than recorded history. Centuries before the Greek and the Romans in their ships were carried to Mesopotamia, Arabia and Egypt, the Indian spices and textiles. This had attracted many sea farers to the shores of India. Long before the Christian era, the Greek merchants thronged the markets of South India buying spices among other precious things. In the year 1492 AD Christopher Columbus discovered the "New World" by crossing the Western Ocean. Albuquerque, the great warrior in his attempt to bring all the spice producing lands and trading ports under the dominance of Portugal, conquered the ancient spice port of Malacca by fighting against the Moslem world.

Ferdinand Magellan sailed through the straits with his two ships Victoria and Trinidad. The ship Victoria reached the harbour of Seville heavily laden with cloves and it was the first ship to circumnavigate the world. Because it was then, that Vascoda Gama was searching for a new route to the spice lands of Asia. In a two year 24,000 mile trip, his ships were taken around the continent of Africa to

India and back to Lisbon. Two out of the four surviving ships brought back a cargo of spices and other.

The spices of the East were valuable in Vascoda Gama's time, as they had been for centuries, because they could be used to stretch Europe's inadequate supply of food. During these middle ages, a pound of ginger was worth a sheep, a pound of mace worth three sheep or half a cow, pepper, the most valuable spice of all. was counted out in individual pepper-corns, and a sack of pepper was said to be worth a man's life. Vascoda Gama's successful voyage intensified on international power struggle for control over the spice trade. For three centuries afterward the nations of Western Europe – Portugal, Spain, France, Holland and Great Britain fought bloody sea wars over the spice producing colonies.

The people of those times used spices as we do today, to enhance the flavour of their foods. In the 16th century AD cloves for instance were among the spices used to preserve food without refrigerator. When spices were not available, people went hungry because they could not preserve their food for winter. This shows the economic importance of spices those days. Pepper is the most important spice of India. Pepper is rightly termed the "King of Spices" and is also known as the "Black Gold of India". Cardamom came next, and is called the "Queen of Spices."

Christopher Columbus made his first voyage across the western ocean and discovered the New World in his search for the spices. Albuquerque conquered the ancient Spice Port of Malacca. He took expeditions to the Moluccas, Burma, Siam and China, in his attempt to bring all the spice producing lands and trading ports under the dominance of Portugal.

The story of spices reveals the founding of the English East India Company under the seal of queen Elizabeth. Its efforts in finding the Spice Islands, and on the Malabar Coast of India, and its subsequent domination of India.

Roaming through woods, in search of food, man suffered injury and had times of sickness from diseases he could not understand. In his distress, he turned to the fragrant oil-bearing spice plants intuitively sensing that those herbs, which are so pleasant to the nostrils, must also be healing to the wounds. He appeased the fearful demons and pleased the virtuous Gods of his imagination by making offerings of the sweet smelling spices. And there begun the uses and customs which have endured through the ages - Spices for food, spices for healing and spices to placate the Gods.

According to Herodotus, on one occasion, Sesame prevented the castration of a number of innocent boys. Periander, Tyrant of Corianth (665-585 B.C) forcibly sent three hundred sons of noble Corcyraean families to Ayathes and the Samians learning what was in store for the boys, hurried them into the temple of 'Diana". Since the Corinthian guards could not enter the temple, they stopped food supplies from reaching the boys. To prevent the boys being forced to surrender through hunger a festival was originated by the Samans which called in part for choir of youth and virgins to stand about the temple holding cakes of sesame in their hands, which the unfortunate boys might snatch. The observance of the festival was kept going for a longer period that the Corinthian guards gave up.

Kings of ancient Egypt erected stone Pyramids to serve as their tomb. The largest of these is the Great Pyramid at Gizeti, 451' high, covering 13 acres built by King Khufu. According to Herodotus, one hundred thousand men who laboured constantly were largely given Garlic and Onion as their nourishment. An inscription on the pyramid records the quantity of onions and garlic consumed by the labourers.

In ancient times, spices were presented to State Dignitaries on special occasions and in festive seasons, offered as political bribes; given as bonus to the Dockworkers. The appropriateness of spices to sacred uses as burning of incense has long been recognised. Spices were used for the funeral pyres of Egyptian kings. King 'Nero' had burnt at the obsequies of his wife a quantity of Cinnaman and Cassia exceeding the whole importation in Rome for one year. These spices were valued in Biblical times also.

During the first three centuries of the Christian era, trade between the Roman Empire and the East, particularly India became quite extensive. The spices of India made their way by the Red Sea to Alexandria. The Moslems controlled the spice trade in eastern waters, and Alexandria and Constantinople came to know an increasing demand from European merchants for the spices of India and the Far East.

The discoveries of Christopher Columbus opened the West Indies to the trade and commerce of the World. Today the world's finest ginger comes from Jamaica and the nutmegs and mace of Grenade are exported to all parts of America and Europe. The spices were highly priced in those days, but understandable when we consider the long and hazardous voyages and overland journeys from the East.

The growing population of the World, the exchange of ideas, the discovery of new lands, the increased production of spices, and the growing needs of the society have steadily developed the modern uses for the spices through the passing centuries. The plant parts which constitute the spices are rhizomes or underground stems from which we get garlic and onion, barks from which we get herbs such as marjoram, rosemary, flowers from which we get saffron, fruits from which we get pepper, cardamom, coriander and a number of other spices and seeds from which we get nutmeg, mustard and poppy. These plant parts contain essential oil, and other

Renovated Show case in the Economic Botany Gallery

chemical substances, which give them fragrant, aromatic, pungent, bitter, acrid or other properties of aroma and taste.

It is difficult for us, who buy our supplies of pepper, cassia, cinnamon, cloves, ginger, mace and nutmeg so casually and so cheaply, to believe that there was ever a time, when these spices were so eagerly sought after and represented so much natural wealth. In their production India has always been pre-eminent, her ports having been resorted to the nations of the latest, from Pre-historic times, in search of these commodities.

Thus the 'History of Spices' is one of adventure, exploration, conquest and fierce rivalry. Exhibited in the spice showcase of the Economic Botany Gallery in the Government Museum, Chennai varieties of commodities of spices are kept on display.

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ANIMAL POISONERS

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There are different types of animals, which carry and use poison for defence and to help them to catch food. Some are bacteria, insects, spiders, fishes, amphibians, reptiles and even mammals. Poison is a substance, when entering the living body in some way it can injure health or destroy life.

There are different kinds of bacteria, most of them are harmless, some of them enable man to make cheese and butter and to manufacture chemicals for industry and medicine. Some bacteria produce poisonous chemicals, which cause disease in man and animals. C.botulinum is an exo-toxin producing bacteria. Its poison is one of the most dangerous and the illness caused by this bacterium is called botulism. When it comes into contact with decaying animal or plant matter, it will make its lethal poison. When an animal or a person eats food contaminated with this poison, symptoms of illness appear.

Venomous Insects:
Insects that can sting are the wasps, bees, hornets and ants. The African bees and the killer bee of South America are the dangerous bees. The giant red bee found in the South American jungle possess powerful sting which can kill a jaguar. Bees, wasps and ants use their stings for defensive purposes and possess large venom glands to supply their stinging needles. The venom contains a chemical called formic acid. In Sweden, there is a large wasp, the Getting; in India and Sri Lanka the large rock bee delivers painful sting.

Ants are the most abundant social insects, some ants not only bite painfully but also carry a significant sting. Some of the most unpleasant of all ants are the black bull dog ants of Australia, which bite and sting, the fire ants of South America leave their needles in the victim's flesh, the venom attacks the white blood corpuscles and the sting will result in skin diseases.

Other Venomous Insects:

A desert bug called Afrur is said to be the most venomous animal on earth. This bug has venom glands that occupy most of its body, it manufactures a chemical, hundreds of times more lethal than Cobra venom. Some insects are poisonous only in the immature or larval stages of their life. The grub of diamphidia, a beetle found in the Kalahai desert of Africa contains a powerful poison, which is extracted from them and rubbed in to the tips of the hunting arrows of the bushmen, who live in those parts. Several moths including the puss moth of the southern U.S., have caterpillars covered with fur. Some of these hairs are linked to venom glands in the skin, contact with these caterpillars can produce rashes, pain and feverish illness in human or domestic pets.

Eight Legged Poisoners:

Large size species of scorpions possess large stings and inject lots of venom, the venom of most of the scorpion's attack the nervous system, causing paralysis of muscles, some forms affect the blood and circulatory system. The most dangerous of all specimens is the fat-tailed scorpion of North Africa. The venom can kill a man in about four hours and a dog in seven minutes. The lobster scorpion of Sumatran jungle and black pandinus of Africa is the largest scorpions.

"O, full of scorpions is my mind" Shakespeare Macbeth.

The spiders are carnivores preying upon insects and other creatures. They do not have teeth and cannot swallow solid matter. Most of the spiders are equipped with poison, not in a sting, but in their biting mouthparts. There are only two families of spiders that have no venom glands at all. The spiders kill the victim with a bite and inject digestive enzymes into the wound that liquefy the internal tissues of their victim. Then they suck the internal tissues leaving the empty shell. There are about 40,000 species alive today. Most of them act as unpaid insect pest controllers. The most venomous spiders in the world are very small. The most notorious is the black widow spider, found in the U.S., Central and South America, Hawaii and the West Indies; it inflicts an agonising bite, which can make a human being ill,

but is very rarely fatal. The brown recluse or fiddleback spider is found in the U.S., and Australia. Its bite is not painful, but it produces fever and severe destruction of tissues and often infection of tissue in the area surrounding the bite. The most dangerous of all spiders is the comb or wandering spider found all over South America. Other dangerous species are the brown or grey widow of the U.S., the funnel web spider of Australia, the button spider of South Africa, the flax spider of Argentina and the jockey or red black spider of Arabia and Australia.

Poison at Sea;

The sea hides many master animal poisoners, some are more deadly than the great white shark or the killer whale. The stingray is characterised by the whipped tail. The stinging organ of the ray is situated on the upper surface of the tail and consists of a spiky barbed spine. The underside of the spine possesses spongy tissue that manufactures the venom. When the tail whips upwards and forwards, the wound produced, the stingray poison affects their circulatory and nervous systems of the victim.

There are many species of fishes, which are poisonous to eat, but the deadly death puffer is one of the most dangerous fishes. There are about 90 different species of puffer fishes, they can inflate themselves, literally puff themselves up into a balloon shape. In puffer fishes poisonous chemicals are located in the skin, liver, sex organs and intestines. In Japan, puffer fish is called fugu and is greatly prized as a very tasty dish after cutting away the lethal parts of the fish.

The most venomous of all fishes is the stone fish. It is an ugly-looking bottom-dweller with a broad flat head, blunt tail and a warty skin covered with slime. It carries poison spines along its back and in its fins, when the spines are erect, a slight touch of the tip will trigger the discharge of venom, which flows along the grooves and into the victim's wound.

There are many other kinds of venomous fishes that deliver poison by means of spines includes the scorpion fish, zebra fish, toad fish and wasp fish.

Besides fishes, other animal poisoners are cone shells, jelly fishes and Portuguese man of war. The most dangerous jelly fish is the box jelly fish or sea wasp. These jelly fishes have stinging tentacles that can kill by means of poison that attacks the nervous system. Portuguese man of war is a colonial organism, which has a blue-bottle float and tentacles, these tentacles bear numerous stinging mechanism, which cause pain, cramps and other nervous symptoms when contacted with naked skin.

Poisonous Amphibians :

Some frogs and toads are extremely poisonous. Most of the amphibians secrete poison in their skin for defensive reasons. The following are the dangerous amphibians :

1. South American arrow frogs, 2. Casliath frog of West Africa, 3. Marine toad
4. Blomberg toad of Colombia, 5. The strawberry poison arrow frog.
6. The yellow spotted frog 7. The golden poison arrow frog,
8. Zatek's frog. 9. The three striped poison arrow frog.

The poison arrow frogs are the most poisonous frogs of all. The blomberg toad can spray the poison liquid out of its head glands, the poison may cause painful irritation and temporary illness. The spotted North American pickerel frog and kokoa frog of Columbia are the other poisonous frogs

Poisonous Reptiles:

Out of over 3000 known species of lizards only one small family of lizards are venomous, i.e, the family Heloderma. This family has two species: the beaded lizard and gila monster. The beaded lizard is Heloderma horridum and the gila monster is Heloderma suspectum. Heloderms are equipped with powerful venom that affects the nervous system and can cause death through paralyses of the respiratory muscles. Unlike snakes, which are fitted with venom glands in the upper jaw and hollow fangs that inject the poison, the Heloderm's venom glands are in the lower jaw and do not connect with the lizards' teeth. The lizards teeth are grooved and when it bites a victim, the toxic juices flow along these grooves and into the victim.

There are about 2700 species of snakes alive today on earth and about 400 are poisonous to man. Snake venom exists to help the animal to get and digest its food; defence is only a secondary purpose. Some snakes produce mainly the nerve – attacking poison, others the blood attacker and others attack both systems in equal measures.

The following are the most dangerous snakes in the world: common cobra, king cobra, kraits, vipers, rattle snakes, sea snakes, taipan, mamba, bushmaster, death adder.

Poisonous Mammals:
The duck-billed platypus is an egg laying mammal found in Australia. It lives at the bottom of the freshwater streams and rivers. It feeds on insect larvae and worms. Only the male platypus produces the venom in a gland behind its knee and delivers it through a hollow, movable, horny spur set on the ankle. This spur can be erected like a pen knife blade and then jabbed into victim's body with a sharp kick of the hind legs. People jabbed by platypus spurs have suffered great pain and puffy inflammation of the affected part for a few days.

Shrews are tiny mouse-like creatures with long, pointed noses. The venom of the shrew is produced in a pair of modified salivary glands whose ducts open near the base of the animal's four lower incisor teeth. The shrew does not produce much venom, but it is effective in killing its prey. The bite of the shrew is not dangerous to man.

Poisonous Preserved Animals Displayed In Chennai Museum:

I . SCORPIONS :

1. Palamnaeus swammerdami, 2. Iomachus punctulatus,
3. Buthus temulus, 4. Lychus tricarinatus

II SPIDERS :

1. Poecilotheria regalis, 2. Poecilotheria metaltica.

III JELLY FISHES, Portuguese man of war

IV THE LION FISH or scorpion fish (Pterois miles)

V REPTILES:

1. Indian cobra (Naja naja),
2. King cobra (Naja bungarus)
3. Viper (Russell's viper – Vipera russelli),
4. Pit viper (Trimeresurus malabaricus,)
5. Rattle snake (Crotalus ruber ruber)

Sea Snakes :

1. Hydrophis obscurus
2. Enhydrina schistosa

Mammals:

1. The duck billed platypus (Ornithorhynchus)
2. Shrews
   - i Pachyura nigra
   - ii Pachyura bidiana
   - iii Anathana elliot

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GEOLOGY IN THE SERVICE OF MAN

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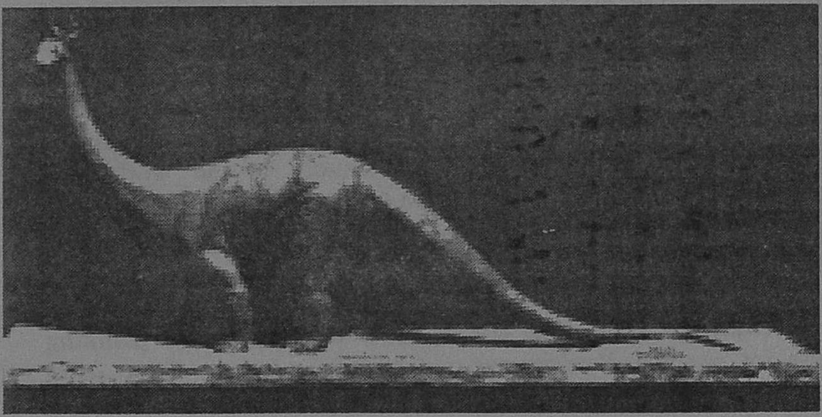
Geology is a multi-disciplinary and interrelated science. It is a discipline of a more comprehensive domain of earth sciences. In the recent years, there is an increasing awareness to understand the importance of this branch of earth science. The growth and development of a nation is mainly based upon its natural and mineral resources. The study of the subject "Geology" calls for an understanding of the earth's history and the process of its formation, distribution of natural and mineral resources of the world and intelligent decisions on sustainable developments. Application of the knowledge of earth science generates mineral resources from land and ocean.

Now a days, the Geologists are in great demand in the planning process for planned development and harmonic living. From mere mapping the various rock types and exploring the mineral resources, today the Geologists are called upon to solve the challenging situations posed by the dictates of nature especially natural calamities such as earthquakes, cyclones, floods, landslides and sea erosion. From fossils, the Geologists are able to identify and reconstruct the animals and plants that lived and flourished in the geological past, the palaeo-climate and environment. Moreover, to day with advanced techniques and instrumentation, the Geologist is able to identify the micro fauna and flora, which forms the source material for hydrocarbon resources in connection with discovering the new deposits of coal and petroleum.

Using remote sensing technique and imageries the Geologist is able to precisely demarcate the geology of the area, natural resources, river migration, land use etc., and to locate ground water resources in order to meet out the drinking water demands. The Geological Museum is a treasure house for the collection of rocks, minerals and fossil specimens. For earth scientists, it is a paradise and departmental store.

It illuminates the past especially the fauna and flora that lived in the geological past in the form of fossils. The natural mineral resources, which form the raw materials for various industries are observed. The rocks and minerals are the attestations of the process of the interior of the earth. In addition to exploring the ocean bottom and Antarctic area, the Geologists have started new ventures by studying Mars, Jupiter and other planets of the solar system.



Model of Brontosaurus

MODELS OF SATELLITE LAUNCH VEHICLES IN CHILDREN'S MUSEUM

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The Indian mind is fascinated by cosmological wonders from the time immemorial. Ancient texts and literatures reveal the evidences of a careful observation of the sun, the moon, the planets and stars. Ancient calendars predicted the transit of planets and eclipses accurately. Though Greek influenced the ancient astronomy and Babylonian ideas, the intellectual climate of this country favoured indigenous thinking. About 1000 years before the Polish astronomer, Nicholas Copernicus (1473-1543) was bórn, a famous astronomer of India, Aryabhatta told that the Earth is a sphere that rotates on its axis and revolve around the sun. He pointed out that a day of Brahma was equal to 4320 million years, which is close to modern calculation of the age of the solar system. He is also credited with the theory that the universe has neither a beginning nor an end. The immensity of the universe and the times-scale of its evolution predicted by the Indian astronomers about 1500 years ago are now catching the attention of many scientists.

In the 18th Century AD, Indian rockets, though uncontrolled, pounded the British in battles near Mysore at Srirangapatna in 1792 and 1799. Hyder Ali and his son Tippu Sultan, used those rockets made of iron tubes tied to bamboo sticks. The gun-powder kept in side the rockets, produced a jet of hot gases, propelled them over a short distance of less than 3 km. The thrust of the gases was too feeble, short lived and uncontrolled to be used for any other purpose. Some of the rockets taken away by the British to England led to the production of a large number of similar missiles used in Europe These rocket models have been preserved in the Woolwhich Museum in England.

The application of modern instruments to foster a spirit of inquiry was how ever slow and sporadic in the country until its independence. In the early 1950s, there were ground-based studies on the ionosphere

and magnetosphere and balloon-borne experiments. The success of the Sputniks (Russian Satellite) and Explorer-1 (America's first satellite) opened a new era of research in space, the satellite became a reality and outer space was worthy of further exploration. In 1961, the Department of Atomic Energy in India was entrusted with the subject of peaceful uses of outer space. A year later, the Indian National Committee for space Research (INCOSPAR) was set up with Dr. Sarabhai as Chairman. The Committee's first major suggestion was the setting up of a sounding rocket range in Thumba (8° 32' 34" north of equator and 76° 51' 32" E longitude) near the magnetic equator (0° 24' N). In 1965, the Vikram Sarabhai Space Centre (VSSC) was established in Thumba.

In 1969, the Indian Space Research Organisation (ISRO) was formed under the Department of Atomic Energy. Work began on designing and making an Indian Sounding Rockets. The first Indian rocket, Rohini-75 (RH- 75), launched on 20th November 1967 was typical of the pioneering effort, proved the skill and confidence of the pioneers. Its diameter was 75 mm, weighed only 10 Kg and it attained an altitude of 4.2 KM. Then bigger rockets were developed and certified by ISRO, the Rohini Series, include RH-125, RH-200, RH-300 and RH-560. These sounding rockets launched almost vertically into the upper atmosphere and instruments on board transit data on the surrounding environment. The RH-560 is capable of reaching an altitude of 360 KM with a 90-Kg payload.

SLV-3:

Based on the experience of designing and making sounding rockets, ISRO started to build a satellite launch vehicle. The four-stage rocket, called SLV-3, powered by solid propellants, launched on August 10, 1979 was partly successful. Subsequent successful missions were accomplished in 1980, 1981 and 1983. On 17th April 1983, SLV-3 blasted of from Sriharikota put a 41.5 Kg Rohini Satellite into Near-East orbit of nearly 400 Km by 850-Km elliptical path. Rohini circled the earth every 99 minutes. It carried a solid state camera, called SMART sensors, which took images for identifying land marks and it ended its mission on September 24, 1984.

ASLV

Augmented Satellite Launch Vehicle (ASLV) was a five-stage solid propellant vehicle weighing about 40 tones, comprising of two strap-ons, complex technologies like new types of nozzles, bulbous metallic heat shield, closed-loop guidance system and internal navigation.

The first developmental flight (ASLV-D1) on 24th March 1987, the second mission (ASLV-D2) on 13th July 1988 were tried and proved to be partial success. The modified ASLV-D3 was launched on 20th May 1992 and the Satellite (SROSS-C, an engineering model) was injected in to the lower orbit of 433 x 267 Km. The mission of ASLV-D4 on 4th May 1994 was described as a text book launch because all the events occurred as predicted and placed the Satellite (SROS-C2) in an orbit 437 x 938 KM.

PSLV

Polar Satellite Launch Vehicle (PSLV) is the first operational launch vehicle of India, which is designed to place an India remote sensing Satellite weighing one tonne in 900 KM. Polar sun synchronous orbit. PSLV has a lift-off weight of about 294 tonne and is 44 M tall with four stages. The first stage is 2.8 M diameter and has 138 tonne of solid propellant, six solid propellant strap-on motors each with 9 tonne are attached to the first stage and rated as the third largest. Solid booster in the world is equivalent to 14 times the core of an ASLV. The 2.8-M diameter liquid propulsion second stage carries 40.6 tonne of propellant. The third stage is a 7.2 tonne solid propellant motor and the fourth stage is again a liqnid propellant motor with two tonnes of propellant. PSLV incorporates closed-loop guidance with an on-board processor. PSLV became operational after two successful developmental test-flights conducted in October 1994 and March 1996. The first operational flight of this vehicle PSLV-C1 was conducted in September 29, 1997 when it placed the Indian remote sensing satellite, IRS-1D, in a polar orbit. With this flight, PSLV has proved its capacity to launch 1200-Kg class pay loads in 817 KM polar Sun-synchronous orbit.

GSLV

Development of Geo-synchronous Satellite Launch Vehicle (GSLV) has been undertaken to achieve capacity to launch 2500-Kg class of communication Satellites in to geo-synchronous transfer orbit. INSAT-1 weighed 1200 Kg and INSAT-2, almost 2000 Kg. Typically, geo-stationary payloads now a days need 2.5 tonne. Hence the most efficient method of reaching the orbit is preferred. GSLV is a three stage vehicle-the first stage employs a 129 tonne solid propellant core motor with four liquid propellant strap-ons with a loading of 40 tonnes each. The second stage is a liquid propulsion system with a propellant loading of 37.5 tonne and the upper stage is a cryogenic engine with a loading of 12 tonnes using liquid oxygen and liquid hydrogen, that remains liquid only at very low temperatures.

Cryogenic Propellant

Cryogenic propellant is colourless, odourless and highly flammable but the flame cannot even be seen. It forms an explosive mixture with air. Liquid hydrogen has low density, $1/15^{th}$ of water. It therefore needs very high-speed multistage pumps to deliver the pressure required. The turbo pumps with hot gas at around 900 K for driving the turbine at one end and liquid hydrogen at 20 K in the pump at the other end result in very high thermal gradient. This affects the hardware. Any leakage will result in explosions. Even the simplest fuel demands careful selection. The CUPS (Cryogenic Upper Stage project) envisaged design and development of a cryogenic upper stage for use in GSLV for flights beyond 2000. It will have a thrust of 7.5 tonnes and carries 12.5 tonnes propellant. The stage which burns for 800 seconds will have a diameter of 2.8 M and measure about 9 M length.

Scale models of ASLV (scale 1:20), SLV-3 (scale 1:20), PSLV (scale 1:20), and GSLV (scale 1:100) are displayed in the Science Gallery of the Children's Museum in the Government Museum, Chennai to kindle awareness and to promote the spirit of inquiry among the children and the visiting public.

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MUSEUM AND ITS ENVIRONMENT

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Introduction:

Museum is a non-profit making permanent institution in the services of the society and of its development and open to the public, which acquires, conserves, researches, communicate and exhibits for purposes of material evidence of man and his enjoyment. Environment is very important for the functioning of a museum. Museum includes the building, the architecture, the lighting, the temperature, moisture, pests and insects, visitors, the staff and so on so forth. In order to preserve the museum collection one should properly understand the environment and act so that the collection will be preserved for the posterity.

Museum Building:

Museum building should satisfy many conditions to be an ideal one. The land, the design, the materials used, the content of the museum etc.

Structural Designs:

In earlier times the structures for museum building had to be evolved on the basis of the then known principles of structural designing, which imposed certain restrictions in organisation of spaces in the building. The modern advancement in structural designing has made available greater possibility in the direction as well for achieving economy in cost of construction. Larger spaces can be provided resulting in great flexibility in planning and ease in making addition and alterations. Lighting and ventilation can be organised in a better way, surface treatment of required type can be ensured, provisions of services and utilities can be arranged at required places and, there fore, the quality of building can be improved. Advancements in

construction technology supported by development in building materials and building products are being applied to museum architecture. One notable development is the planning;, designing and construction of tall buildings and heavier structure instead of low rise buildings. The introduction of industrialised building methods and prefabricated techniques of construction have resulted in speedier construction and architectural forms, modern in concept and design.

While planning the construction of a museum building the following should be kept in mind:

1. The architecture of the building should be based on the type of objects available, the future development, easy for the reach of the public, transportation facilities etc.
2. The building architecture should be based on the number of visitors, number of staff of the museum and the changing trend in the future.
3. Since the visitors' facilities should be given importance, it should be kept in mind that provisions should be made for the future facilities to be provided.
4. It is always better to have a co-ordinated building in order to have better security and for the easy access for the visitors.

Components of a Good Building for a Museum:
A building is beautiful when it is functional and planned for convenience. The components of the building decide the good architecture suitable for a museum. Good museum architecture is also decided by walls, floors, ceilings, ventilation, relief areas etc., of the building. The treatment of walls, floors, ceilings, ventilation, relief areas etc., help to the gallery to have a good look.

Direction of the Building:
Whenever new buildings are constructed the direction of the building should be decided. In the tropical country like India most of the months the sun's hot rays fall on the buildings. If the direction is north-south the sun's rays will not enter into the buildings. It is also better to have proper sunshades to avoid the slanting rays in some months.

Public Area:
The public area is nothing but the area available for the public who enters the museum. This includes reception, sitting spaces, waiting halls, shops, lecture theatre, education rooms, refreshments, shops, toilets, permanent exhibitions, special exhibitions, library, archives and records, documentation, study collections, curatorial offices, etc.

Relief Area:
It is monotonous when one continuously looks at the galleries. Therefore some break ups in lobbies, little garden, seating arrangements for relaxation may be provided.

Support Services Area:
In order to maintain and make available the museum's resources, space must be allocated to a range of support functions. General museum services include direction, administration, security, maintenance workshops, cleaning equipment stores, materials stores, mess rooms and welfare facilities. In support of the collections space must be found for conservation laboratories and studios, the reception of incoming material and facilities for staff involved in fieldwork, research and collecting activities. In support of the presentation of the collections must be workshops, photographic facilities, design studios, offices for editorial staff, publication storage, information and public relations activities.

There should be separate entrance for the service area for the staff and a separate entrance for vehicles etc., to transport materials. Depending upon the size and kind of the museum the service area differs. The architecture of a museum should be suited to serve and convenient to use. The building should be functional and help visitors giving recreation

In general the total area can be divided as follows:

Permanent and special exhibitions	: 30%
Storage and archives	: 25%
Theatre and educational services	: 10%

Relief area	: 5%
Support services	: 30%
	100%

Security Arrangements:

The building must have security arrangements such as fire extinguishers, water pipe lines for the supply of water in an emergency, fire alarms, closed circuit television, smoke detectors automatic sprinkler systems etc.

Temperature and Moisture:

Temperature and moisture are responsible for most of the defects occur on the collection of mostly organic nature as well as metals. The temperature and moisture should be controlled to increase the life expectancy of the cultural and art materials. Many museums control these two factors in so many ways. It is very important to monitor the two factors before taking any step to control these two factors. There are many equipments to monitor these two factors. They are hair hygrometer, digital hygrometer, recording type of hygrometer, etc. Similarly to measure the temperatures there are digital thermometers, recording type of thermometer, thermo-hygrometer to measure both temperature and moisture content in air. Many museums are trying to air condition the building only during the visiting hours. Some museums have air-conditioned the galleries 24 hours. Unless the relative humidity and the temperature are controlled to the optimum value, both the objects and the building would face many problems thereby the objects would be damaged. Air-conditioning the buildings would increase the cost of maintenance spoiling the collection. Monitoring the whole gallery area for the ambient temperature and relative humidity and adjusting the condition, the collection will have longer life.

Lighting:

Museum galleries must have proper lighting arrangements, alarms, smoke and fire detectors, electricity arrangements, diesel generators to use in the absence of electricity. Now a days there is a breakthrough in the lighting in museums. Fibre optics lighting is the best to safeguard the museum collection.

Even though light is damaging, it is necessary for viewing of objects. Lighting is very important environment of the objects. There are two types of lights. They are natural and artificial lights. Light has a very

bad constituent called ultra violet light. This portion of light would weaken the organic matter and the colour would fade and the materials will appear old. Natural light has more ultra violet light and there fore use of direct sunlight should be avoided in museums. Objects should never be displayed near open windows, as the light would fade the objects if they are exposed to the natural light. Tube lights produce much ultra violet light and there fore use of fluorescent tube lights in the galleries should be avoided. Now a days tube lights, which will not emit ultra violet light are available. Fibre optics, halogen dichroic lambs are also very much in use. In India, the Chennai Museum is going to install fibre optics in the National Art Gallery to illuminate few paintings of Raja Ravi Varma.

Pests and Insects:
Pests and insects play havoc in museums. Their control is highly essential and there fore periodical monitoring of insects and pests is highly essential. There are many methods of control of these pests and insects. Now a days non-toxic pest control is very much liked by the conservators.

Calamities:
Museums are prone to the dangers of natural calamities such as fire, flood, cyclone etc., and human factors such as vandalism, war, ethnic problems, strike, bomb scare, building collapse.

Fire:
The reasons for fire is using open fire in the galleries, smoking in the galleries, using inflammable chemicals in the galleries, electrical short circuiting, using open halogen lamps, bombing in galleries etc. There are many ways of preventing fire in museums. Avoiding inflammable materials from the vicinity of the displayed and stored objects. Not allowing smoking inside the galleries, not allowing open fire in galleries, changing the electrical wiring regularly, keeping fire extinguishers in galleries, installing smoke detectors and automatic sprinklers in galleries. Above all, the staff of the galleries and museums should be trained in fire fighting so that in the event of fire, the suppression of fire could be done on time and save the cultural property. With this intention the government has sanctioned Rs. 1.5

lakhs for the installation of fire extinguishers in all the galleries and training is provided for the entire staff of the museum. This museum has prepared a Disaster Management Plan.

Flood:

Flood is sudden and flood could affect the entire collection if the cultural objects are accessible to the flood. Always there should be provisions to keep all the water prone objects beyond the reach of the flood. Museum authorities should be aware of the warning given by the Meteorological Department and proper preventive measures should be taken. The staff should be trained in the disaster management in case of flood.

Human Factors:

Human factors such as vandalism, ethnic problem, strike, procession, theft, unawareness etc., play havoc in the preservation of the buildings and the collections in a museum. It is better to check the belongings of the visitors, when they are entering the museum galleries. In British Museum, London, Museum of London etc., the visitors are checked before allowed entry into the museum. Most of the museums watch the behaviour of the visitors through the CCTV. This is very common in European, American, Australian museums. The National Museum, New Delhi and Indian Museum, Calcutta are the Indian museums with the facility of CCTV. Action is under progress to install CCTV in the Government Museum, Chennai. The Chennai Museum has the facility of having an out post of the police too safeguard the buildings and their collection 24 hours.

Management:

Proper management will reduce the risk of the museum building and its collections. The Chennai museum has prepared the disaster management plan for the department of museums, which can be followed by all the museums in Indian condition. Proper review of the situation, monitoring the condition regularly, taking proper preventive and remedial actions on time, giving proper training in preventive measures, during the disaster and after disaster measures on various aspects of disasters.

Conclusion:

One must have a proper knowledge of the functioning of a museum and the environment, which protects or affects the museum building and its collections. The routines of a museum should be strictly adhered to. Rosters of works to be carried out should be done accordingly. There should be systems, which will help in sorting out the disasters, should be installed. Fire alarm, burglar alarm, temperature and humidity alarms, insect and pest traps, bomb detectors, smoke detectors, automatic sprinklers etc., will be of use for the museum authorities to know the disasters on time and act swiftly to fight against them and save the building and cultural heritage in museums. A co-ordinated effort from the authorities and related experts as a team will be of use to protect our precious cultural and artistic heritage for posterity.

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